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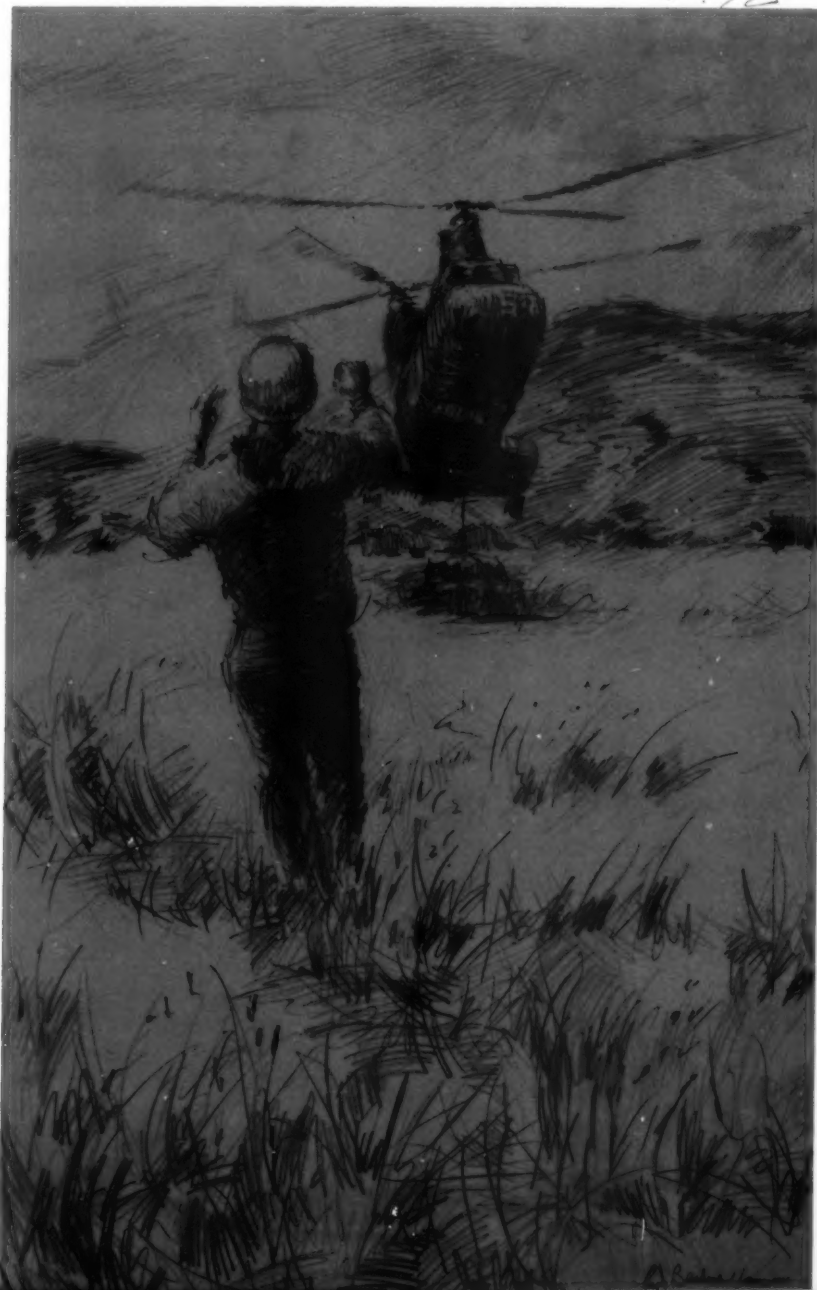
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# **THE AVIATION PHYSICAL**

By LT J.F. McCluskey (MC)

He who is  
physically fit is ready to meet  
any challenge.

**M**an generally is apprehensive when about to embark into the unknown or the poorly understood.

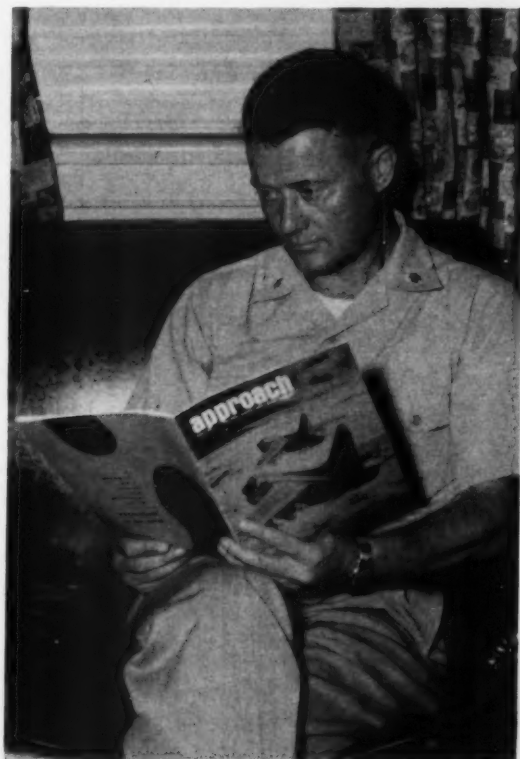
For this reason most aviators consider their annual physical exam as a threat—they have visions of disappearing into that black void known as the aviation examining room where those frustrated aviation-type charlatans, the aviation medicine technicians and the flight surgeons, will relieve them of their cherished Wings of Gold. This is usually imagined as being accomplished by slipping the poor unfortunate such mumbo jumbo as “You’ve got 15 diopters of esophoria, 10 of right hypertropia, not enough prism divergence and horror of horrors, your PC is greater than your PD!” And, as if this all weren’t enough, “you busted the Falant, only got 17/18th on the Verhoeff, and 6 on the accommodation rule. Sir, have you ever considered being a mail orderly? ?”

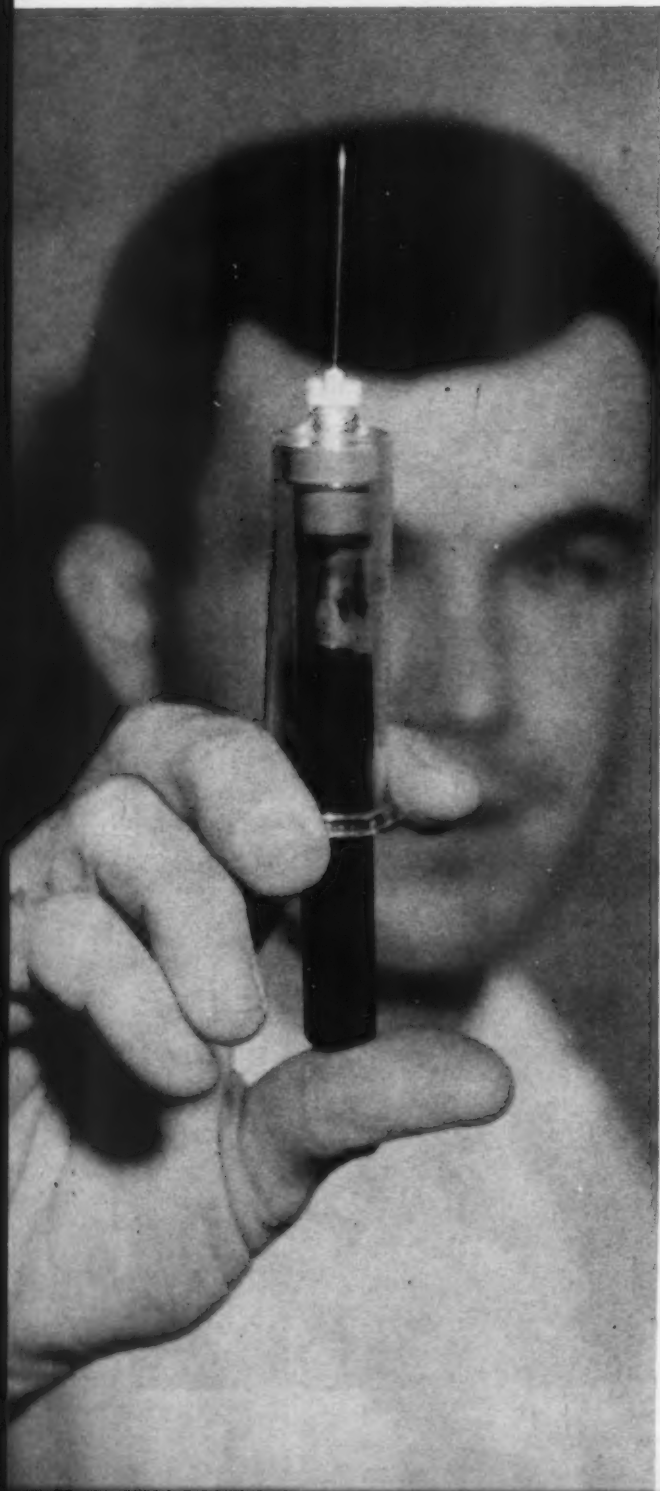
All too frequently a person with nothing to worry about approaches the annual physical with something less than even an outward calm, feeling that the end is certainly near. Most of this seems to stem from the fact that he does not understand what the physical is all about nor does he understand what is expected of him.

It should be remembered that a flight surgeon's main responsibility is to keep as many aviators healthy and flying as possible. However, there is enough anxiety associated with the annual physical, causing blood pressures and pulses to rise, for a few words of explanation to be well warranted.

It should be pointed out that an aviation physical is essentially a thorough general exam with particular attention to eyes, ears and circulation system. With this in mind and in an effort to better understand just what is going on in the aviation examining room, let's talk our way through an annual physical and see what it's all about.

Continued





### Laboratory Tests

First of all, the lab tests—blood and urine—and the chest X-ray. The blood is drawn for only one test, that being the STS or serological test for syphilis. The urine is checked for any evidence of urinary tract disease, and especially for indication of kidney malfunction. Conditions affecting the body as a whole, diabetes, for example, will frequently show up first in the urine. A thorough study of the chest X-ray tells the medical officer not only whether the subject has any active or past lung disease, but gives him at least an idea as to the condition of the heart, windpipe, upper spine and diaphragm as well as the ribs. These three tests, the STS, urinalysis, and chest film, are generally all that are required, but any study which seems to be indicated may be performed. However, in general, these three will give the MO a fairly good idea as to his subject's general health.

Next, the weigh-in. Enough has been said else-





where about the proverbial "standard + 20" and the evils of obesity. Suffice it to say here that the standards published by BuMed are merely guidelines and if in the opinion of the MO the subject is not obese and in good physical condition, *any* weight is acceptable.

Next comes the blood pressure and pulse and their response to exercise. This test measures general physical condition, particularly fatigue, by measuring circulatory efficiency. Briefly, a healthy performance depends on a low reclining pulse, small rise upon

standing and after exercise, rapid return of pulse rate to "normal" after exercise, and finally a slight rise in systolic blood pressure upon standing.

It should be obvious from the above that aside from good general physical condition, the two most important factors are adequate rest before the test, and relaxation during it. The individual who arrives at the aviation examining room in an excited or nervous state with the resulting high pulse rate and blood pressure is already well on the way to busting this test. So remember, *rest 'n' relax!!!*

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### Audiogram

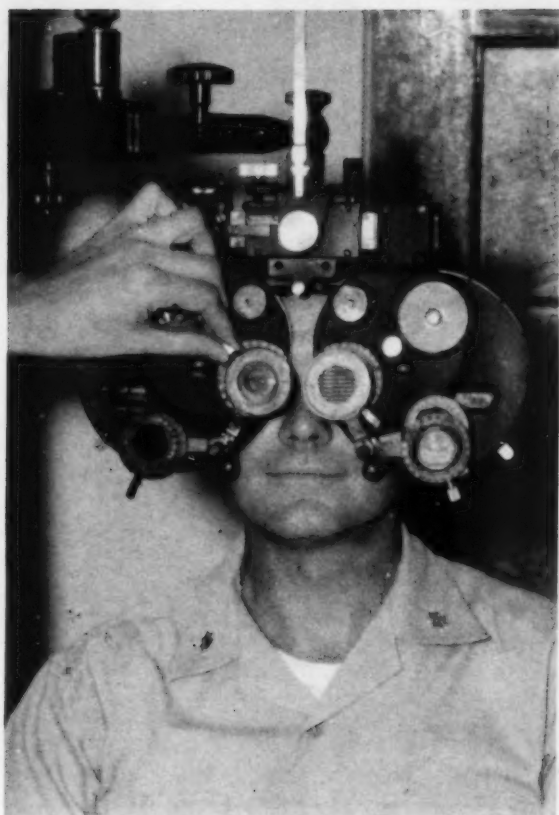
If the equipment is available, an audiogram is done. This is a highly accurate test and measures the ability of the ear to hear, the degree of damage to hearing which may be present, and where in the hearing mechanism this damage most likely exists. Although the ability to hear frequencies of 500 cycles per second through 2000 cps is the only one required to be measured for designated NAs and NAO(I)s, the audiogram usually includes measurements of from 250 cps through 6000 or even 8000 cps.

The audiometer is so calibrated that the minimum amount of sound intensity required in each frequency for the *average* ear to perceive as sound is delivered by the machine when "zero decibels" is set on the intensity scale for that frequency. The amount of sound intensity, measured in decibels (db), required for your ear to "hear" sound of a given frequency is then measured. A - score means that at that frequency your ear requires that much *less* sound energy to hear, or is that much *better* than average. A + score is a measure of how much more sound



energy in db is required by your ear to hear that tone than the average. This figure is spoken of as the "hearing loss." Anything falling between -15 and +15 is considered "normal." A loss of more than 15 db is abnormal, and if the loss is greater than 30 db in the speech frequencies (300-3000 cps) difficulty in hearing the spoken word will be encountered. In general, the aviator is allowed up to 40 db loss in one ear at 1000 cps and 2000 cps, not more than 20 db loss in the better ear from 500-200 cps.

Aviation personnel are subjected to much high intensity, high frequency noise. This will initially cause hearing loss beginning at a frequency of about 4000 cps because of the anatomy of the organs of hearing, eventually becoming more severe at this frequency and branching out to the next higher and lower frequencies as well. This on the graphic audiogram gives the classic "aviator's notch" so commonly seen in aviation personnel. This loss will eventually involve all frequencies, but may be arrested if detected in time and preventive measures are taken—thus, the advisability of the complete audiogram.



### Visual Acuity

Visual acuity is, in general terms, a measure of the eye's ability to define an image, or the ability of the eye to "see." What the test is actually measuring is the ability of the eye to bring an object into sharp focus on the retina. If the image which falls on the retina is blurred, so is the image "seen" by the brain. The degree of discrimination which an eye can achieve is a direct result of the ability of its optical system to sharply focus that image on the retina—just the way an image is focused on the film by the lens system of a box camera. The Snellen eye chart, used in the aviation examining room, measures this "visual acuity."

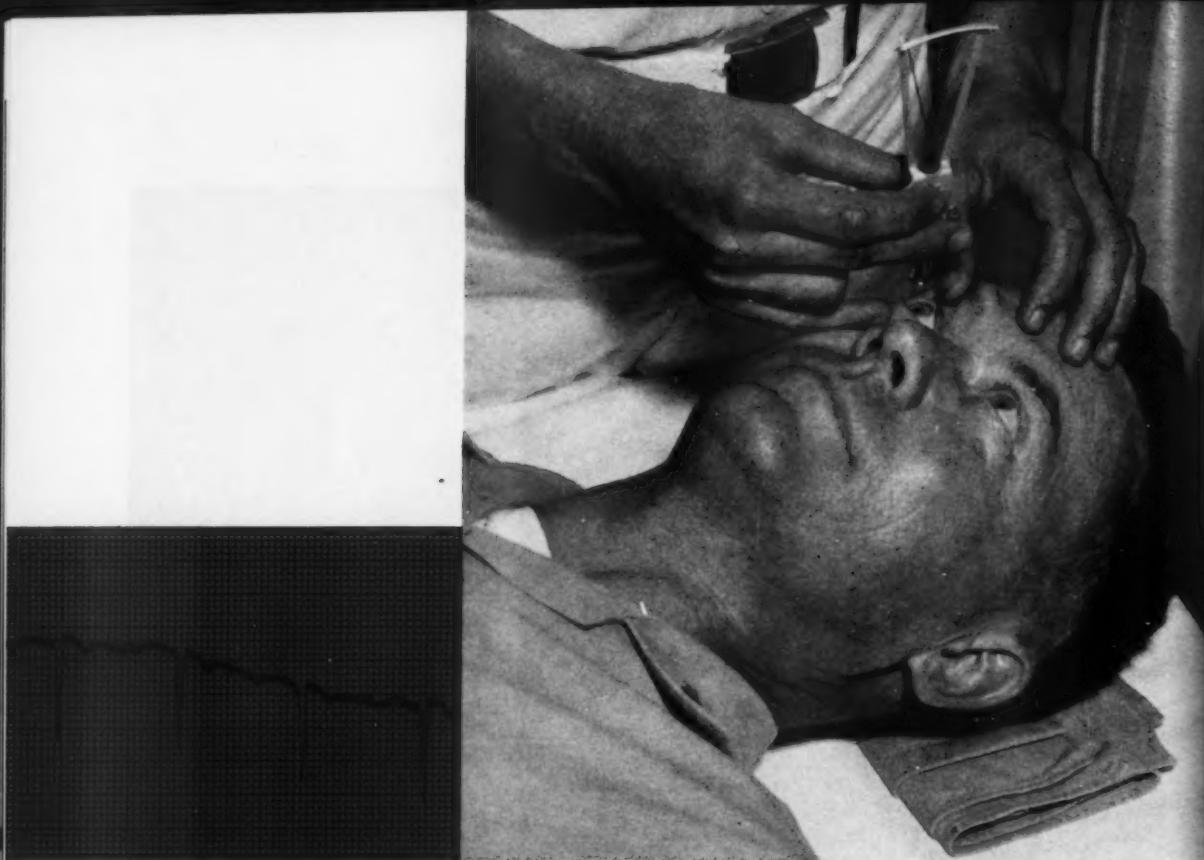
Now — the grade given. Average visual acuity is 20/20. This means that an individual can see at 20 ft what most people can see at 20 ft. Actually, it means that at 20 ft the eyes can define an image made up of blocks which, at 20 ft, subtend an angle of one minute. It is easily understood, therefore, that the values are algebraic—that is, if your vision is 20/20, it is also 10/10, 40/40, or 200/200, since the

same relative size is involved; thus a cross-check exists to aid the examiner.

Vision 20/15 is better than average, but still good enough for Service Group I. Remember, 20/15 means an individual can see at 20 ft what most people must be at 15 ft to see, or at 20 ft a person can see and define an image which at 15 ft subtends an angle of one minute. As a rule the test is performed at 20 ft because at this distance the normal eye is relaxed, no focusing being necessary as 20 ft is the "optical infinity" of the eye.

Now, 20/20 vision in each eye is fine, providing that the eyes line up in such a way that the brain sees only one, sharp 20/20-type image. If for some reason the eyes are not exactly aligned, diplopia or double vision results. This, of course, does not mix with aviation for obvious reasons. Moreover, in aviation the flyer's bodily movements are limited and he must depend to a great extent on movements of the head and eyes to give him a wide field of vision. Again, even when straining head and eyes to extremes, there must be no diplopia.

Continued



### Phorometer Test

The movements of each eye are effected by the action of the six extraocular muscles (EOM) attached at approximately 60-degree intervals to the globe which are controlled by impulses from the brain which always attempts to achieve only one sharp image. To test for any possible weaknesses or imbalances, therefore, the influence of the brain on these muscles must be eliminated. To do this, a device known as the phorometer is used. This instrument provides different images to each eye—a line to one, a point of light to the other. Because there are two different images being "seen," the brain makes no attempt to superimpose the two, no impulses are sent to the EOM, and the eyes assume a relaxed position, which may or may not be in alignment. If the muscles of each eye are perfectly balanced, the eyes will be aligned and the subject will see the line and the dot superimposed on one another. If some imbalance exists, which is usually the case, the line and the dot will be separated. To bring them into alignment then, prisms are placed in front of the eyes which bend the rays of light in such a way that without



moving the eyes the images are moved to the same point on each retina, thus superimposing the line and the dot as seen by the brain. The amount of prism power, measured in diopters (one diopter of prism power will bend a beam of light 1 cm. at 1 meter), needed to cause the images to become superimposed is then read from the phorometer and recorded. This gives the examiner a measure of whether the eyes tend to deviate in (esophoria), out (exophoria), up or down (right or left hyperphoria), and by how much.

Service Group I aviators are allowed 5 prism diopters of esophoria, 5 prism diopters of exophoria and 1 diopter of hyperphoria. Ten diopters of exophoria, incidentally, is allowed if there is no double vision.

#### **Prism Divergence**

Along the same lines, the ability of the eyes to turn out is also measured. This test is called the "prism divergence," and measures the power of the lateral muscles of the eye. To do this the subject looks at a point of light and at the same time prisms of increasing power are placed in front of one eye bending the light in such a way that the eye must rotate

outward to maintain a single image in the brain. When the limit of outward rotation is reached, the eye "breaks" in and double vision occurs. At this point the amount of prism power is noted and recorded as prism divergence. In general, when the test is performed with the light 13" from the subject, there must be at least 12 diopters of prism divergence to qualify for SG I standards.

The ability of the EOM to rotate the eyes inward is measured by obtaining the point of convergence, that is, the nearest point directly in front of the eyes at which the eyes can fix upon an object without diplopia. This is measured by advancing a small light down a ruler toward the nose and measuring the point at which the eyes break apart and can no longer maintain one image. This is the point of convergence, abbreviated as the PC. The intrapupillary distance (PD), or distance between the two eyes, is then measured. The PC must be less than the PD, both being measured in millimeters.

As stated before, all these tests are designed to detect those eyes which, under any given set of circumstances, may not be able to maintain a single



image. The acceptable values have been arrived at by trial and error and are the maximum errors of balance which may exist in the aviator's eyes without causing him double vision under situations which might be encountered while flying. The standards for the various types of flying personnel will vary with their jobs.

#### Accommodation

In the normal eye, rays of light originating at a point 20 ft or more from the eye are focused on the retina by the "resting" lens and cornea. However, to bring an object which is less than 20 ft from the eye into focus the lens must add power and the eyes must converge. This process is called accommodation and is the process used by the aviator to adjust his eyes from a scan of the horizon to a scan of his instruments and also a measure of how long he can comfortably maintain a scan of these instruments. The test is simple, a card of letters is simply advanced away from the nose along a ruler until the subject can see the letters on the card clearly. The maximum accommodative power of the lens, measured in diopters, is determined. The accommodative power of the lens decreases with age, and for SG I the aviator must be within 3 diopters of the mean for his age. As an example, the average 30-year-old pilot has a total accommodative power of 8.9 diopters in his lens. The 30-year-old pilot must, therefore, have a minimum of 5.9 diopters to meet the standards for SG I. Low accommodative power usually results from age, hence the need for reading glasses at about age 40. Fatigue or disease may result in lowered accommodative power and a decreased ability to alter scan rapidly and/or maintain close objects in focus for prolonged periods of time, these objects usually being the instruments in the case of the aviator.

The necessity for complete color perception and depth perception in the aviator is obvious. The tests for these are simple and direct. For color, the Farnsworth Lantern (Falan) is used, showing three



cardinal colors, red, green, and white in groups of two at a time. All must be identified correctly. The Verhoeff stereopter consists of a box with a lighted background and three bars of different sizes placed in such a way that one is always in an odd position, either forward or back. There are four sets of positions of the stereopter and it is rotated up and down during the test so that, in all, 16 positions are presented to the subject and the position of the bars in all 16 must be properly identified to meet SG I standards.

The peripheral fields of vision, so necessary to the fighter pilot, are outlined by having the eye fix a central object, and then bringing another object in from various angles until it enters the peripheral field which is then outlined. Not only the size, but the shape of the peripheral field for each eye is then examined and interpreted. Any marked deviation from what is considered to be the normal size and shape is cause for further investigation.

For men 35 years old, and older, an additional eye examination is done: The pressure within the "eyeball" is measured with an instrument called a tonometer, and the reading is known as the intraocular tension. An abnormally high pressure is seen in the disease known as glaucoma. Glaucoma is most common in older persons, and leads to blindness unless it is detected early and treated properly.

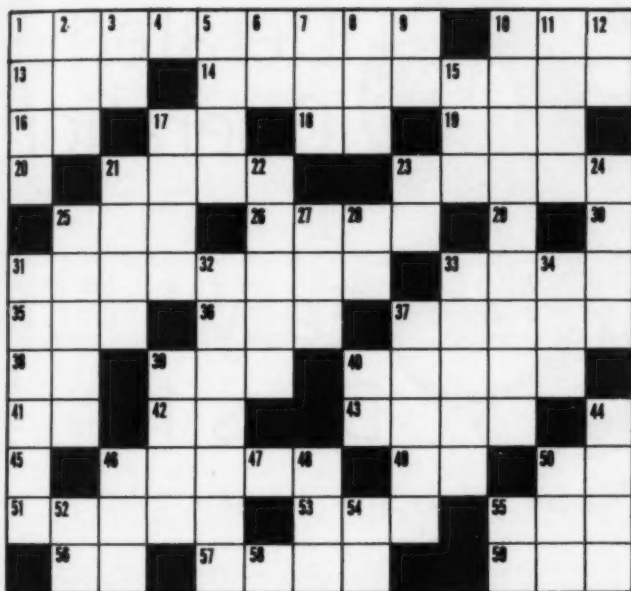
The remainder of the examination is essentially a simple, complete physical from head to foot and needs no more explaining here. Suffice it to say that the more thorough, the better. Remember, the flight surgeon doing the physical is doing so in an effort to prevent you from having troubles. With this in mind, it is hoped that the foregoing information will make your next physical more easily understood and therefore less of a stress and strain for all concerned.

\*Dr. McCluskey was released from active duty in June, 1965. This article, written when he was a flight surgeon with VMFA-314, originally appeared in the MAG II "Hot Line." It has been updated by LCDR J. R. McTammany, MC, NavAvnSafeCen.

# HS-11's Thought for the Day

All of you helo drivers take note. The ASO of HS-11 cooked up an interesting thought-provoking crossword puzzle concerning the SH-3A. See if you can score 100 percent on the first try. Answers to be compared with the gouge on page 47.

Would like to receive more of this type concerning the F-4B, P-3A(B) . . .—Ed.



## ACROSS

1. SH-3A Electrical Power Source
10. Most Important Squadron Component
13. Rotation About Vertical Axis
14. Section of Engine Containing Fuel Pump
- \*16. Seat Pilot Sits In
- \*17. Navy Base in San Francisco Bay
- \*18. Non-Electronic Navigation
19. Engine With Rotor Lockout System
- \*20. % Nf When Flex Shaft Fails
21. Holds Cyclic
23. Vietnamese
- \*25. 677°C T5
26. Cars Drive on It
- \*29. Handle Pulled When Engine on Fire
- \*30. ARGON
31. Where Helos Land
33. Shipboard Compartment
- \*35. Where Helos do Touch and Gos
36. Fish Eggs
37. \_\_\_\_\_ Gradient
- \*38. Flown After Dark
39. HS Helos do this
40. Ship \_\_\_\_\_

- \*41. It's Zero When Hovering
- \*42. Repairs Airframe
- \*43. Brings Mail (2 wds)
44. Worst Grade
45. Best Grade
46. String of Mules
- \*49. Converts a.c. to d.c. Power
- \*50. Lights at 200 lbs. IP-5
51. Nav Aid for GCA
- \*53. Ship Sonar
- \*55. Stabilizing System
- \*56. Rotor Speed
57. ½ of Split Tour
- \*59. Servo for 55 Across

## DOWN

1. Sensors for Stabilizing Equipment
2. Do it in Mess Hall
- \*3. Direction From Bermuda to Quonset
4. Navy Award
5. Meteorologist Concern
- \*6. Primary Electrical Power
- \*7. Indicates Range and Bearing to Target
8. Above (Poetic)
- \*9. Holds up Helo
10. Heater Bus
11. Needed When Turning Helo
- \*12. Eastern State
15. Distress Signal
17. Helo can do it While Airborne
21. One Helo of Section
22. RPM May do it
23. Installs T58 in Helo
24. Given to Enemy as POW
25. Ice Does it
- \*27. Exercise Determining Readiness
28. Repairs AN/APN-117
31. Enclosure for Helos
32. Lost When Both TRs Fail
33. Helicopter Wing
34. Navy School
37. Given at Court Martial
39. Nav Computer Needs it
40. Parent
44. Engine Control Input Shaft
46. Recip Mechanic
47. Hooks Holding Engine Doors
48. Eggs
- \*50. Southern University
52. Rate
- \*54. Flight Surgeon
55. Rate
58. HS-11 Hopes to Win This

\*Abbreviations

*There is no operational technique that can reverse the effect of high thrust. There are just so many operating hours at high thrust in every engine. Whether they are used up quickly or dispersed evenly throughout a normal, calculated period of time, depends upon how closely and conscientiously time, temperature and thrust limits are observed.*



## Derated Operation or Easy Does It

By LtCol W. L. Walker, USMC

**I**s full cob always necessary?

In jet operations we have a tendency to charge around at full bore most of the time. Seems most of us have developed a habit of two-blocking the throttle for all situations. A habit pattern that is the same for all situations is an indication we are not capable of selective choices and this is bad—bad for jet engine life.

Development of such a habit stems from using 100 percent power on takeoffs—plus afterburner—if we have it—to get airborne sooner. We climb at max allowable to get to altitude so we cruise sooner for max range and max fuel reserves at the point of intended landings—the charts are made this way. Waveoffs are full cob. An intercept may call for all you've got and then some. Bombing hops call for high power and throttle manipulation.

Yes, the military aviator frequently milks the engine for all it can produce—but, is it always necessary?

Turbojet engine life is directly related to tempera-

tures and their duration—the higher the temperatures and the longer they are applied, the shorter the life of the engine. Of course there are variables such as rate of application and the effect of Gs, but temperatures of extremes still remain the primary consideration.

Conversely, lesser exposure to high temperatures means longer engine life. For example, a commercial operator is permitted 7000 hours TBO (time before overhaul) on certain engines. Few of our engines achieve 1000 hours TBO. The difference is *modus operandi*. We're not attempting to compare commercial operations with military operations but cite these figures to show turbojet engine life potential. Military engine life can be extended if we exercise good judgment in many of our operations.

Here are some possibilities:

**Cross-country Instrument Flights**—Use of 100 percent for takeoff only until safely airborne and then throttle back to some lesser power setting. This power will depend on the bird. Reasonable charts can be

developed to cover each one. True, this will shorten the legs of the bird—file for a shorter distance. Remember, fuel is cheaper than engines.

**Intercepts**—These can be made at less than 100 percent. If less power were available, the intercept could still be made. Using full cob to regain position is salvaging a run which could have been prevented with better technique.

**Rendezvous**—No requirement for full cob—again full throttle operation is called on to salvage a poor rendezvous. The answer—improved technique.

**Bombing**—Conventional bombing seldom requires 100 percent power. Most pilots push to the stop on pullout from a run to insure he has adequate power without looking at the gages—His head should be out of the cockpit looking for other aircraft and

getting into position, but full throttle practice is not really needed. Some thought should be given to training at lower speeds and less power during initial practice with final practice at higher speeds. Lofting is a different matter which requires full throttle.

There are some who think a secondary throttle stop would be helpful to a pilot in performing degraded operation, particularly in bombing operations where he relies on feel for power. The secondary stop, would have to be one which could be by-passed or overridden for 100 percent power when needed.

Any way you hack it (no pun intended) conservation of jet engine life deserves more than just conversation. Your inputs will be appreciated.

For more on the effect of temperature on engine life, please read "Time, Temperature and Thrust."

# TIME, TEMPERATURE AND THRUST

**T**HERE is a need for a clean-cut understanding of the intent of the time limits specified for Military and Maximum operating conditions. These 30- and 15-minute limits are established on the basis of the engine qualification tests which require these time limits during each cycle of the endurance runs. The limits have been carried over into the flight operating instructions as maximum time limits for these higher thrust ratings. The purpose of these time limits has been to discourage prolonged operation at the high thrust conditions in order to prolong engine life.

In order to obtain a better understanding of these time limits, an understanding of the factors reducing engine life when operating at high thrust conditions must be obtained. High engine rotor speeds increase centrifugal stresses in the compressor and turbine rotating parts (discs and blades). The temperature increases which accompany these

high rotor speeds reduce the ability of the heat resistant alloys in the hot section to withstand high stresses.

This material distress with high temperatures is manifested in several different ways. The most important factor is that of *creep*. Creep is defined as the gradual elongation of metal over a period of time while subjected to very high temperatures. This creep is manifested by elongation of turbine blades, as well as buckling and warping of turbine nozzles and combustor liners. In the later stages of creep a turbine blade will rupture completely.

A second factor causing hot section distress which is primarily exhibited in the turbine blades is *stress-rupture*. Each heat resistant alloy has a finite time limit at which it can stand high stresses at specific temperatures prior to complete failure by rupture. This time period is inversely related to temperature (increasing temperature de-

creases time).

A third mechanism of failure is by fatigue. Fatigue failures can be caused by high frequency vibrations induced by interaction of stators and turbine blades or aerodynamic excitations from the hot gas flow. Fatigue failures can also result from variation of centrifugal and gas loads on turbine blades due to changing thrust conditions.

Another cause of weakening leading to failure is thermal shock stress. Thermal stresses are a result of significant changes of temperature throughout the hot section which cause the metal parts to contract and expand accordingly, as determined by their coefficients of expansion. Due to the non-symmetrical shapes and varying thicknesses throughout these parts, contractions and expansions are unequal, thereby setting up internal stresses. The material cracks and distorts in an attempt to relieve these stresses. Although these ther-

mal stresses may not cause failure within themselves they will cause the parts to be weakened and also set up stress concentrations, thereby making a part more susceptible to failure by the other mechanisms.

From the causes noted above, excepting thermal shock stresses, time at a given temperature is the main factor in determining how long a part will last before it must be replaced or fail. Whether a part fails by creep, stress rupture or fatigue will depend on the design and operating environment of the part in the engine. As an example, J57 first stage turbine blades have the governing factor of creep, as the blades will stretch to a certain point. At this time they should be replaced because of the danger of rubbing the case and failing.

On the J33 Series 1 engines of the GMR-235, material turbine blade failures encountered have been by fatigue. The effects of time at high RPM and temperature on the remaining life of a hot section part are cumulative. It is somewhat irrelevant whether this high thrust time is put on the blade all in one period of running or stretched over a long period of service operation of the engine, during which the high thrust running is done in short intervals. Fatigue cracking and distortion caused by thermal stresses, on the other hand, is governed by the amount of starts and changes of thrust in operation of the engine.

In specific reply to the questions asked on the basis of the above considerations, the following is offered:

*a. Does the maximum RPM limit of 30 minutes apply to an engine which, at full RPM, is indicating a TOT of only 580°C?*

*Answer:* Research data (National Advisory Committee for Aeronautics) now show that a significant reduction in life of

turbine parts is experienced when operating at Military RPM, even with no temperature increases involved, as compared to Normal RPM. Therefore, the 30-minute time limit must apply when either the full RPM or maximum allowable TOT only is reached.

*b. To what RPM should the engine be throttled back after 30 minutes at full RPM?*

*Answer:* The effects of time and temperature are cumulative and the hot section of the engine will have a given life at maximum allowable temperature operation whether this time is used up in one continuous period or in several intermittent periods. If the engine were to be throttled back after the 30-minute period at Military with the intent of boosting the engine back to full power again after a short time at the reduced thrust conditions, the main effect on the engine would be to subject the hot section parts to thermal stresses. Therefore, this action would be more harmful than helpful to engine life. The answer here is that if the mission absolutely necessitates operation at Military or Maximum conditions for longer than 30-minutes no action to reduce RPM for only a short period should be taken, as this will be of no help whatsoever in maintaining engine life. Therefore, operation should be continued at the Military RPM until the mission permits reduced thrust.

*c. How long must the lower RPM be maintained prior to beginning another period at full RPM?*

*Answer:* It is considered that this question has been answered by item (b). However, it is desired to note here that engine life is roughly inversely proportional to the thrust conditions at which it operated. Research data show that a 100°F reduction in maximum operating temperature, coupled with the nom-

inal reduction in RPM going with decreased thrust operation, may increase the life of turbine blades by a factor of 40 to 50 times. Therefore, for safety of flight and to realize maximum engine life prior to removal of the engine for hot section maintenance, pilots should be instructed to operate at the lowest thrust conditions compatible with mission requirements.

Important factors in jet engine hot section life are over-temperature and overspeed occurrences during starting (over-temperature only), accelerations and steady state operation. The excessive temperatures greatly accelerate metal deterioration due to the effects as noted earlier in this article, while overspeed conditions greatly increase centrifugal stresses. In addition, excessive temperatures may cause metallurgical changes in the alloys, thereby, greatly reducing their ability to withstand temperatures and stresses in future operation of the engine at high thrust conditions. Therefore, it is very important that all occurrences of RPMs and temperatures above prescribed limits encountered in starting and flight be noted and recorded.

*Editor's comment—Though this article originally appeared in the May 1959 issue of APPROACH, some seven years ago, the J57 and J33 engines are still very much in service and the information contained herein concerning them is still highly appropriate. The article is based on a former BuAer (now Naval Air Systems Command) letter clarifying RPM and temperature limitations. There exists a possible area of conflicting overlap between Military and Maximum operating limits of turbojet engines. Refer to the appropriate NATOPS for the particular model aircraft engine operations limits, where such conflicts arise.*

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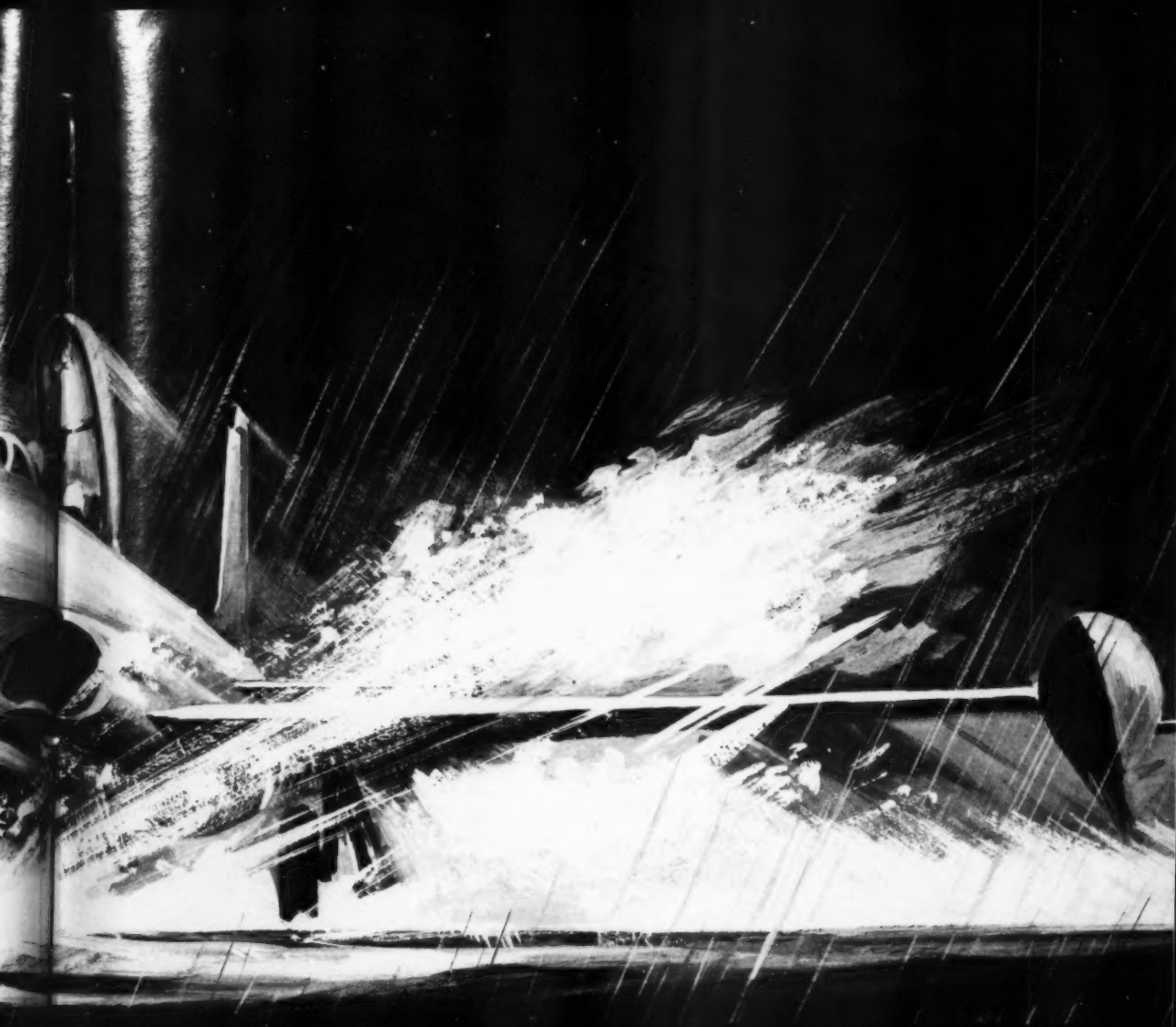
## BEWARE OF PROPS

LINE personnel are walking in the prop arc of S-2F aircraft. Never walk through the prop arc. Prop blades have never lost an argument yet with a human being.

—Safety Council







## 'It'll Probably be all Right.'

By MAJ Ronald B. Weinert, Operations Officer, 190 FIS, Idaho Air Guard

**T**here are two kinds of emergencies. First, the one which happens without warning. It is suddenly there, and you cope as best you can. For instance, your mill blows up just as the gear hits the wells. This causes some immediate consternation, but you don't have much choice. You punch out, or you grit

your teeth and ride it in. The action is clearcut in that immediate remedial action is necessary. You act. You either make it—or you don't.

Most emergencies fall into the second class. They are not sharply defined as life and death emergencies, and, in addition, they are usually pilot induced. These

are the ones causing most of the accidents, and, I would guess, most of the fatalities. The pilot is faced with a soggy situation, but one which he contributed to, and which just might be pulled out of the fire with no one the wiser. Every pilot has had these situations develop. Fortunately, most of us have the skill or luck to salvage the whole messy affair; unfortunately, no one learns much from the experience, including the near victim.

The fuzzy emergency is what this article is all about. It is the result of a pilot action, or lack of it, coupled with some unforeseen event which *by itself* would be a minor emergency, an aggravation, or no problem at all. The pilot says, "It'll probably be all right," and presses on. Most of us have had similar experience, but what most of us haven't done is to examine it closely enough to prevent similar happenstance. We are darned sure not to get caught in exactly the same spot again, but we usually stop there, and don't carry the examination to its logical conclusion, which is, what really caused all the sweat? Was it the compressor stall, overtemp, flameout, and all that good stuff, or was it the fact that I blundered into the big cumulus type cloud in the first place? *Maybe* I should have changed the old flight plan or asked center for a vector.

It comes down to one answer. We have a close one, heave a sigh of relief to have come through, vow never to get caught in *that* one again, and then commence to go out later and take chances again and again under different circumstances. "It'll probably be all right."

Let's face it, there aren't enough hours or enough people to go through each and every emergency successfully and mentally scratch it from the list. Besides, that's doing it the hard way. Why not eliminate those wormy messes we cause ourselves, and prepare for the first type emergency I mentioned, the one which is completely beyond our control, the one which is all of a sudden upon us?

Here is an example that happened to me a while back. This was during transition from the F-86 into the F-102. Our simulator hadn't arrived yet, so all pilots were forced to travel to Travis, Portland, or Paine to use their facilities prior to actual transition

in the aircraft. I finished MTD and began to look around for a suitable base for some simulator time. Paine seemed the most likely prospect as it had a currently available simulator, and it was my old home town to boot.

I cornered one of our new F-102 IPs, and asked if he would care to foray to the "big city" to give me a little simulator instruction. It seems he had just lapsed currency in the *T-bird*, due to his three-week checkout at Perrin, and he was eager to get re-current. This looked like a good way to get two things accomplished with a minimum of expended time and energy.

The weather at Paine was forecast IFR upon our arrival (isn't it always IFR at PAE?), so I elected to fly the front seat going up, as I didn't relish a strange field landing in possible rain with an uncurrent troop in the front, and my back seat proficiency rusty through lack of attention. As it turned out, the



Let's face it, there aren't enough hours or enough people to go through each and every emergency successfully and mentally scratch it from the list.

weather at Paine was practically CAFB when we arrived, and we could have accomplished a good check right there before landing. It should have been a recognizable omen, because it was the first time in years I had arrived at Paine with anything other than raggedy minimums, or worse.

I got two simulator rides that day, and a couple the next morning. We were scheduled back in Boise before the end of the working day, so I decided I'd get one final hour after lunch while my partner filed for Boise (I dug up a willing IP from the 64th to administer the simulator time). We had very casually requested transient alert to only fuel the "T" with 150 in the tips, since the trip home was a short one and we weren't expecting significant weather. After all, if it was clear in Seattle, Boise would certainly be.

I met him at the aircraft. He had filed almost direct at 21,000 ft. This had been at my suggestion.

What the heck, it was a 45-minute trip, and no point in climbing into the stratosphere. The weather man cooperated with a forecast of 4000 broken and 15 miles, thunderstorms scattered with tops at 25,000. No severe weather warnings. Alternate: Mountain Home, weather same. Both stations reported existing weather as scattered clouds. No sweat. "It'll probably be all right."

We switched seats and launched, he in front and me in back. The weather at Paine was clear and 60, about as beautiful a day as two carefree souls could ask for. Over the blue mountains, just as I was in the midst of a good story about a Navy pilot who couldn't seem to do anything right, we noticed a darkening sky beyond Baker. It looked like a dandy thunderstorm right in our path. My partner called Salt Lake Center and requested a deviation to the north of course, which looked like the brightest area. As we sung Baker VOR, it was apparent we weren't

I was in no mood to poke my nose into that black looking beggar.



The thought of the actual ejection wasn't nearly as disturbing as the question of how I could have gotten us in that position in the first place.

going to get around the big rascal.

We talked it over and agreed we were at just about the worst possible altitude for thunderstorm penetration, even in the Pacific Northwest, land of the teeny-weeny bumpers. At my suggestion, he called center and checked tops reports, along with Boise and Mountain Home weather. They answered "Last reported tops in the Baker area FL 390. Boise weather 4000 broken, visibility 15, winds 280 at 7." Mountain Home reported about the same. No sweat.

I was in no mood to poke my nose into that black-looking beggar, so I suggested we cancel and drop down, proceeding VFR to Boise. This was a violation of a long-standing rule of mine never to cancel without having the field in sight, but at the time it seemed like the right thing to do. We couldn't top them, and penetration was out of the question. Destination *and* alternate were VFR, and we were intimately familiar with the terrain. We had 250 gallons. Distance to home was 55 miles. We cancelled and descended VFR, staying on the west edge of the precipitation.

We levelled off at 4000 ft, which put us about 2000 ft above the terrain. By this time we were at Ontario, Oregon. The airport there was wide open, and we were beginning to pick up light rain. Beyond town, in the direction of Boise, heavy showers stretched across our flight path from north to south, with occasional lightning, cloud to cloud and cloud to ground. We turned south in hopes of skirting around via the Snake River. Fuel approached 200 gallons. I didn't like the looks of things in that direction. It looked better to the north to me, although I knew the terrain rose sharply. I suggested a turn in that direction, but he held a southerly heading, muttering something about getting through if we just kept on a little. Still no sweat. "It'll probably be all right."

I took the UHF and called Boise Tower for the latest weather. We got it. "Three hundred overcast, visibility one-fourth mile, heavy rain, wind south at 25 gusting to 35." The runway at Boise is 10-28.

At this point I began feeling those little pins and needles on the back of my neck. I switched to Mountain Home Metro and got almost a duplicate report

for that station. I changed back to Boise Tower, and our Combat Alert Center called. It was the duty officer, somberly informing us that Boise was really bad, and we had better go elsewhere. Fuel indicated 160 gallons.

Now I really began to get scared. This was what was known as a *sticky wicket*. I had put us there. I had put myself in an even stickier one. Here I was, a not-too-current IP, with a noncurrent pilot in the front seat, about to run out of ideas. He was still flying the airplane, and by this time had turned north, since no holes or light spots had appeared or his original southerly heading. We were milling to the right and to the left almost simultaneously.

We discussed landing at Ontario. The runway glistened wetly in what little light was left, and I wouldn't look forward to landing on a 4500-foot runway even on a dry day. I vetoed Ontario. We discussed the possibility of having to bail out. More hairs prickled on the back of my neck. The Accident Board flashed vividly before me. Sifting the evidence, they would find an IP with 3000 hours in the machine, caught short on ideas and fuel and forced to consign the bird to the sagebrush. The thought of the actual ejection wasn't nearly as disturbing as the question of how I could be stupid enough to get us in that position in the first place.

I had to do something. I took control of the airplane, called Boise Approach Control for an approach clearance, declared an emergency due to low fuel (140 gallons) and initiated an off airways climb to 10,000 ft, north of Victor 4. The terrain slopes up steeply from the valley floor to a maximum of 7500 ft at Schaeffer Butte just north of Boise, so I knew that would be high enough. Boise had no approach traffic, fortunately, and came back with an approach clearance to Runway 10 left. At about this time we broke out over the town of Horseshoe Bend, about 20 miles north-northwest of the field. No terrain of any consequence occurs between there and the runway, so I descended to 4000 ft to intercept the localizer.

We picked up the runway just inside of the outer marker. It was raining heavily, but at 1200 ft above the ground we were clear of clouds and able



"We're going off!" I shouted.

to negotiate our way visually. The hair on my neck snapped back to its normal position and the knot in my stomach relaxed. The blood stopped pounding and I almost started whistling "The Wild Blue Yonder."

I reported the field in sight, and requested surface winds. They were 200 at 25 gusting to 30, so we circled to land on 28. About this time, my colleague said, "OK, Sky King, you want me to take it from here?" I declined, since several things were in favor of my landing from the back seat. I knew I could see better from back there in a driving rain. He wasn't even current, so better to have me take the whole thing.

On downwind he asked if I was *sure* I didn't want him to land it. I was sure, I said, and briefed him to get his hand on the canopy unlock and open the canopy when I told him to. Big deal! The big IP with all his time was really in charge. But the big IP forgot he didn't fly it as well as he had when he was getting 90 hours a month in the back seat. But, "it'll probably be all right."

We touched down very near the end, and very fast . . . at about 120 kts indicated and 140 kts ground speed, since the wind shifted to about 150 degrees as we crossed the threshold. I pulled up the flaps, tried the brakes, and found them nil. I called, "Crack the canopy!" He did, and we didn't slow down a cotton-picking bit. "All the way!" I cried bravely. He ran it all the way open at

about 100 kts indicated, and I got some immediate braking. I also got two fire hoses in the choppers, one from each side. At this time the tower called and cheerfully reported that our nosewheel was cocked 90 degrees. The witnesses on the flight line, of which there were about 70, since it was quitting time, later said *the entire airplane from the intakes aft was completely hidden in a sheet of water*. I was manfully pumping the brakes, getting no response, backing off, pumping again. We were still going like a bomb.

The streams of water in my eyes subsided just in time to see the intersection of runway 7-25 go by. That is just 3000 ft from the bitter end. I distinctly recall seeing the fire truck sitting at the side of the runway just past the intersection as the nosewheel uncocked and we boresighted him. He jammed it into reverse and the wheels churned frantically in the haste to get out of the way. He needn't have bothered. It was too late.

I shouted, "Oh (obscenity), we're going off!" My partner agreed emphatically. At that time (speed around 45 kts, the nosewheel cocked to the other side) we lurched back to the centerline. The brakes took hold with about 1000 ft to embarrassment (we had finally stopped hydroplaning), the nose straightened, and we came back under control for the first time in over 8000 ft.

At the ramp and safely into the chocks, I rubber-

legged my way down the ladder. It was still raining very hard. The troops hurried out to meet us. Have you ever tried to be nonchalant while you have both hands on your knees to keep your legs from giving way beneath you?

I had bitter words for the weather man that night over couple of bottles of brand X. The facts are, though, that he called them the way he saw them, and missed. It was up to me to determine the requested margin to carry us through a missed forecast. A higher altitude would have done it, or full tips, or both. A lot of "ifs" might have caused us to make it comfortably, or to plant the beauty in the desert.

OK. End of war story. I don't relate it in an effort to show how daring or skillful I was. The facts point to quite the opposite. I tell this story because it is a classic example of "It'll probably be all right." There was no frightening emergency, initially. This near bash was a result of basic errors, compounded by a few variables, which, by themselves, would have been mere aggravations.

Several things are salient, and should be analyzed as a result of this experience. I would probably never get caught in just the same circumstances again, but what can be done to keep from arriving in a similar untenable position through similar basic errors in judgment?

First, and this is elementary, expect the unexpected. It might not be the weather next time. The runways might be closed, headwinds might be stronger than forecasted, any number of things could occur to make them fuel tight. Pay attention to what you are doing, and don't take chances.

If you are going to play IP, it requires you to take responsibility. Do yourself a favor and stay proficient in the IP chair. I said *proficient*, not legal. You might be able to stay proficient in the right seat of a "Tub" with one landing every 45 days, but not me, brother. Same goes for a *T-bird*. You can squeak by on VFR days with one of the

squadron pilots who is current, but what about the stranger who is in for a checkout, or Tac Eval ride? What do you know about the state of *his* proficiency? Throw in a black, stormy night, and, friend, you're asking for pilot error. The tight spot comes and what do you do? Do you let the unknown quantity make the approach end landing, or the snap-up, or whatever the problem is, or do you try it yourself, knowing your abilities are not what they should be? It is your responsibility, either way. There are several problems here. For instance: As long as you are the IP, your fellow pilot is not really making his own decisions. He is waiting for you to "Make the Save." Which brings us to:

Do something! If you don't take command of the situation, you can get yourself into that "simultaneous milling while in the same airplane." It isn't much fun. In the tale above, the man in the other seat was perfectly capable of making a decision, but my failure to do anything caused his indecision, and something had to be done. He would have assumed command sooner or later if I hadn't, but it may have been too late to prevent disaster. You are the IP, so act like one. If you don't like the look of things, take over. It may offend the other pilot, but that's better than a broken fanny.

The best handy aid I can see is this. Any time you catch yourself saying, "It'll probably be all right," *watch out!* You are about to enter dangerous circumstances, or you wouldn't have had occasion to utter the phrase in the first place. Never, never allow yourself to get into a hole where the only thing you can think of is that you shouldn't have done it, or that you knew better. This alone can make the difference between success and failure. You become so worried about the mistake that got you into the mess, you are unable to think out a clear solution. Anxiety about what the Old Man of the Accident Board will say has caused many a pilot to ride his 'chine until it's too late.

—Adapted from the "Interceptor"

'It'll probably be all right,' is a dangerous phrase. It is either right or wrong, and there is no 'probably' in this game. 'Probably' will probably kill you sooner or later.



An LC-130F enroute to NAS Quonset Point, from NAF Andrews, was on the final state-side leg of a successful mid-winter Antarctic Air Evacuation Mission. Takeoff from the last OP stop had been uneventful and a routine SID completed. As the aircraft passed through 10,000 ft still climbing, a sudden, violent downdraft was encountered. The indicated airspeed at this time was 170 kts. A second but more moderate shock was encountered shortly after the first.

Approximately five minutes before the shocks were encountered, the navigator had picked up indications of approaching storm activity on the aircraft radar. Once the navigator had confirmed his findings he notified the pilot and gave instructions for circumnavigating the area. The storm, at the time of initial notification, was approximately ten miles away. The copilot immediately passed instructions over the ICS for all personnel (including crewmembers) to keep their seat belts fastened.

Due to the LC-130F's configuration (large internal long-range fuel tank and a spare engine (QEC)) the forward portion of the cargo compartment and its lighted seat-belt sign, *were not visible to flight*

*crew personnel in the aft section of the aircraft.*

The flight scanner instructed the electrician to leave the flight deck and go aft to ensure all personnel had been properly notified and secured in the aircraft. As the electrician approached the cargo ramp area and was relaying the warning to one of the crewmen, the aircraft encountered violent turbulence. The electrician was violently lifted off his feet and thrown backward against the port para-troop door, receiving a fracture of the left wrist area and severe lacerations. At the same time, the metalsmith suffered severe contusions of his left elbow when he was thrown into the overhead aft on the starboard side of cargo compartment.

Except for some minor loose items (blankets, ashtrays, etc.) being tossed about no other injuries or aircraft damage was incurred. The injured crewmen were given first aid while a detailed inspection was made of the aircraft for possible damage. The rest of the flight was routine and a land-

ing subsequently made at the home base.

As a result of an investigation the board concluded that the primary cause of this aircraft incident was hidden weather and its attending turbulent conditions. These conditions were *not specifically forecast*. When detected by the navigator on the aircraft's radar, immediate steps were taken to prepare the aircraft and crewmen for the fast approaching weather conditions, but unfortunately they were not fully implemented as the aircraft penetrated the weather mass.

The pilot of the LC-130F at the time of the incident was under positive traffic separation control of Center radar but had received no warning of the hazardous conditions existing in the area along his flight path. The board also concluded that an improvement of the ICS/Public Address system, the installation of an additional seat-belt warning sign and the possible use of the Emergency Warning Alarm might have expedited communications with remote areas of the aircraft.

## BAD NEWS



# Short Snorts

22

## F-4B Hot Brake Blowout

A recent incident has demonstrated that overheated F-4B brakes and wheels are still dangerous even after the tires have blown and the airplane has stopped rolling. In this case, the tire blew during the takeoff roll, and the pilot aborted at 120 kts. By the time the airplane got stopped, the tire was worn down to the rim and the brakes were pretty hot. To keep the unchocked plane from rolling the pilot applied emergency brakes. When the cold emergency air hit the hot brakes, a piece of the pressure plate blew out, doing further damage to the wheel door. It could also have done considerable damage to someone trying to chock the wheel; fortunately, this time, nobody was in the way.

The moral seems to be: don't apply emergency air to hot brakes unless necessary—and if necessary, be sure everybody is well clear.

## Engine Analysis Pays Off

While operating in normal cruise, 10 percent lean, the captain of an SP-2H noticed an erratic firing pattern on the port engine while checking the engine analyzer. The rear row of plugs were firing at 27 degrees before

top dead center and the front row at 30 degrees TDC.

About 15 minutes later the front row went to 32 degrees TDC while the rear continued at 27 degrees TDC. A shift to rich/retard made no improvement, and shortly thereafter the front row was firing at 33 degrees before top dead center.

The pilot feathered the engine as a precautionary measure and then returned to base.

Investigation showed that the port distributor was full of ice, and the advance relay solenoid was inoperative. The starboard distributor showed evidence of extensive corrosion.

## When All Else Fails

The Naval Aviation Safety Center, and other activities are very interested in the flight recorders being installed in some military and civilian aircraft these days.

Such equipment, usually constructed to be crash survivable, gives vital information in the event of an accident about material failures as well as actual flight parameters, such as heading, altitude, airspeed, and so forth. Naturally this information is quite useful to investigators, as has been proven

in several airline incident and accident investigations.

Some of these installations also give readouts which are useful to the maintenance troops. Data helps mechs adjust various components and sometimes suggests inspections or other actions which avoid an engine or component failure in flight.

However, until such time as suitable equipment is either available or purchased for naval aircraft, there is a simple procedure which many flight leaders use to get some of this information.

When flight conditions permit—repeat, *when time, flight situations, and ejection envelope permit*, and all other reasonable means of engine recovery have failed—the chase pilot has the ejectee read off the indications of the various engine instruments.

This plan—again when time and altitude permit—came to light in review of many jet accidents in which the pilots could *not* recall the fuel flow.

Granted there is not always time, but there is at least one model of aircraft in which *no fuel flow readings* have ever been obtained from the pilot who ejected. What makes this important is that

this particular engine has a fuel control problem, and much of the wreckage is lost at sea, precluding laboratory analysis of the fuel control, various hoses and couplings, or other possible contributing factors. It is acknowledged that the emergency dropout generator is not always wired to provide power to all gages.

So how about adding this thought to your emergency procedures—when time and conditions permit, get engine instrument readings, either to the chase pilot, or to a suitable ground facility.

### Safety Committee

One of the most impressive listings of personnel composing an Enlisted Aviation Safety Committee crossed our desk recently. It was contained in the monthly safety minutes from NAS, South

Weymouth, Mass.

The committee included representatives from:

VA Line	Public Works
VP Line	Quality Control
HS Line	
Maint Control	Power Plants
Operations	Fire House
Ordnance	MARTD
Airframes	Ground Support
AE Shop	Para Loft
AT Shop	Air Crew
	Training
Supply (Fuel Medical Farm)	

Safety Officer  
(Recorder)

How does your Enlisted Aviation Safety Committee compare in representation?

### Avoid Those Bumpers

OPNAVINST 3710.7C states: "Flight through forecast thun-

derstorm areas should be avoided whenever possible by planning routes that circumnavigate these areas, or by delaying the flight. Should available weather information or flight urgency not permit such planning, pilots should request deviation from route/altitude as far in advance as possible from air traffic control. Avoidance of thunderstorms may be accomplished by using available NavAids, airborne radar or radar vectors provided by air traffic controllers.

However, pilots should bear in mind that all areas of precipitation will not appear on the controller's radar scope due to the controller's use of anticlutter devices and secondary radar. Nor will clearance to circumnavigate all thunderstorm areas be authorized, particularly when arriving and departing terminal areas."

—Adapted from Message  
Second MAW

23

### An Abort in Time Saves . . .

A young fighter pilot recently took off as lead of a flight of two on a navigational mission. Soon after takeoff the lead aircraft lost two-way radio communication. The leader, through hand signals, directed his wingman to take the lead and then he continued the flight as wingman.

Near the end of the flight the aircraft with communications trouble experienced severe engine vibrations and engine explosions which resulted in complete engine failure and subsequent ejection of the pilot.

In another accident, which occurred after the aircraft experienced tacan and radio failure, the pilot continued the mission, even though there were snow showers in the area.

These are but two instances of a trend that continues to cost both lives and equipment. The trend is the frequency of aircraft mishaps which occur after a pilot has experienced an airborne aircraft malfunction and elects to continue the assigned mission apparently is on the increase.

This attitude on the part of some pilots can be appreciated but it is foolhardy. No training mission is of such importance that a pilot should ignore the first indications of malfunction, no matter how insignificant, and continue the mission.

With the complexity of the new weapons systems, a seemingly insignificant airborne malfunction can multiply into a real emergency before the pilot can get on the

ground.

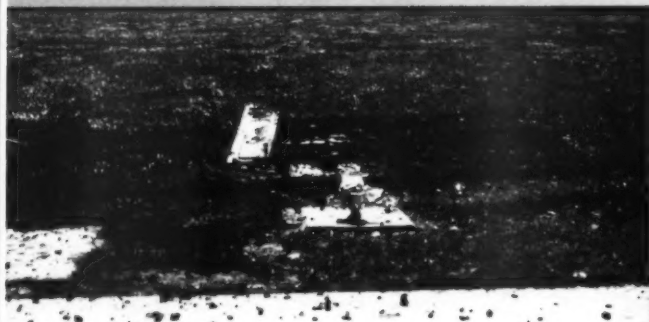
In the past, a pilot who continued a mission with a malfunctioning aircraft often got away with it, but the chance of similar success in present-day aircraft is much less. The pilot who experiences an aircraft malfunction, gambles that the malfunction will not be compounded and continues the mission, jeopardizes his aircraft, his life and the overall mission.

Remember this, if you continue your mission after experiencing a malfunction and you experience no further trouble, it only proves that once again you have beaten the law of averages. But, also remember, if you lose, you may forfeit your life because this is the stake for which you are playing.

—Para/ Flyer



Without proper monitoring, contractor installed wheels-up warning light foundation improperly.



A-4's nose gear collapsed after striking taxiway light base. Nosewheel door was shorn in process.



Five-foot square concrete manhole cover for access to electrical wire servicing runway lighting. . . .

## ARE THESE CONDITIONS

This picture story highlights the cause and effect of some airfield design has been gained through the years and today Standards, NavWeps 00-100-505. A number of older installations in these fields and equipment are updated it is expected that the case. For example, the wheels-up warning light installation, up these have been built according to specifications outlined in Naval Aviation Practices do not conform to the Planning Standards.

The latter specifications require including both end zones, to be 12 inches

Before work of any kind on the airfield, mandatory standards for all personnel concerned with naval aviation shore facilities.

Other publications that should be used



... wiped out landing gear of errant F-8 in end zone area.

# DITIONS NECESSARY?

ect of unnecessary and costly mishaps. Much experience in  
s and day is embodied in specifications outlined by Planning  
er installations may not conform to present-day standards but as  
cted that the new standards will be met. However, such is not the  
stallation, upper left; the arresting gear marker, upper right. While  
outlined in NavWeps 51-50AAA-1 for Visual Landing Aids, instal-

standards

quire foundations for lights and other markers in the runway shoulders, (within 150 feet of the runway)  
e 12 inches below the finished grade.

on the airfield is contemplated, reference should be made to NavWeps 00-100-505. It establishes man-  
nel covered with programming, planning, design, maintenance, repair, construction and operation of

uld be used as reference material for standards criteria and programming data include:

NavWeps 00-500-501, Evaluation Report

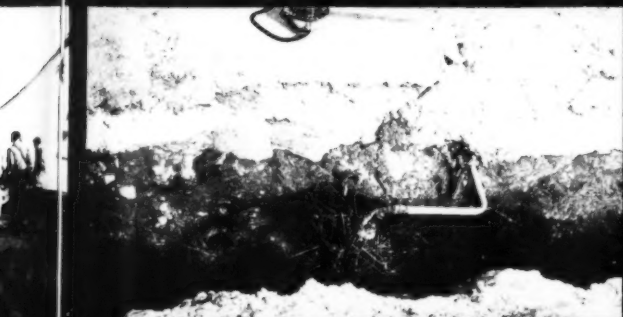
NavWeps 00-500-502, Air Contour Maps

NavWeps 00-500-503, Planning Manual

NavWeps 00-500-504, Programming Guide



Arresting gear marker mounted on frangible couplings but base should be 12 inches below graded surface.



Open trench following light wiring repair presents hazard to aircraft and allows additional damage by rainfalls weakening runway base course.



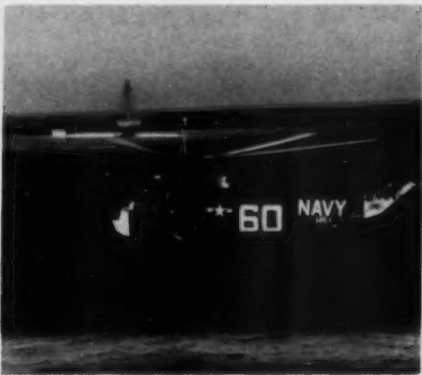
Initial damage to F-8's main mounts occurred upon contacting approach light concrete base pad on civilian field.

NAVAIRLANT · W



**Readiness Through Safety**

# NT Wins CNO Safety Award



This award marks a fresh assault on all factors of aviation safety and accident prevention. Acknowledging the fact that combat readiness is materially affected by safety, this award is presented to the one major command whose contribution to "Readiness Through Safety" throughout the fiscal year was adjudged most significant by the Chief of Naval Operations.

In announcing the winner this year, the Chief of Naval Operations said, "While flying almost six percent more hours than last year ComNavAirLant units reduced their aircraft accident rates to a figure which is lower than the overall Navy/Marine accident rate. This safety record is the result of an aggressive accident prevention program carried out successfully in consonance with improvement of combat readiness among individual units."

Under the command of Vice Admiral C. T. Booth II, Naval Air Force, Atlantic Fleet, accomplished a 22 percent aircraft accident rate reduction in Fiscal Year 1966.

Upon learning of the award, Vice Admiral Booth said: "This trophy is a reflection of the professionalism that exists throughout the Naval Air Force, Atlantic Fleet. We had 46 accident-free squadrons during the year—a notable achievement. To these squadrons in particular, to all other NavAirLant squadrons and aircraft units and to literally thousands, military and civilians, aboard ships, in the stations and in the overhaul and repair activities who support our operations in the air with their knowledge and hard work, I extend my congratulations."

# CNO AWARD WINNERS

28



\*Denotes consecutive awards

## ADMIRAL JAMES H. FLATLEY MEMORIAL AWARD WINNERS FOR AVIATION SAFETY

USS F. D. ROOSEVELT  
CVA-42

USS BENNINGTON  
CVS-20

USS OKINAWA  
LPH-3





# Distinguished Safety Achievement

## Fiscal 1966

Commands recognized for their significant contributions to the overall safety program by their commanders as indicated.

\*Denotes repeat performance within the last three fiscal years.

### COMNAVAIRLANT

VA-12\*  
VA-15  
VA-35  
VA-42  
VA-43  
VA-45\*  
VA-46  
VA-83  
VA-106  
VA-172  
VA-176  
RVAH-6\*  
RVAH-12  
VF-62

VF-103  
VP-5\*  
VP-7\*  
VP-8\*  
VP-18  
VP-21\*  
VP-26  
VP-44  
VP-45  
VP-49  
VP-56  
VS-22  
VS-27\*  
VS-28\*

VS-30  
VS-32  
VS-34  
VS-39\*  
HS-5  
HS-9\*  
HS-11  
VW-4\*  
VR-24\*  
VRC-40\*  
VX-1

### COMNAVAIRPAC

VA-127\*  
VA-155  
VA-195\*  
VAH-8  
VAH-10\*  
VAH-123  
VAP-61\*  
VAW-11  
VC-1\*  
VC-3  
VC-7  
VF-24  
VF-121  
VF-126

VF-162  
VP-1  
VP-2  
VP-4\*  
VP-6\*  
VP-9  
VP-22\*  
VP-28\*  
VP-40  
VP-42  
VP-46\*  
VP-47\*  
VP-48  
VR-21\*

VRF-32  
VS-21  
VS-25\*  
VS-29\*  
VS-33\*  
VS-35\*  
VS-37  
VS-38\*  
VS-41\*  
VW-1\*  
HS-2\*  
HS-8  
HS-10\*

29

### CG FMFLANT

VMCJ-2  
VMFA-251  
VMFA-531  
VMT-1  
HMH-461\*

HMM-162  
HMM-262  
HMM-264  
HMM-365  
H&MS-14\*

H&MS-24\*  
H&MS-31\*  
H&MS-32  
HEDRON FMFLANT

### CG FMFPAC

VMA-121\*  
VMA-211  
VMFA-323  
VMF(AW)-212  
VMF(AW)-232

VMGR-352  
VMO-2  
HMH-462  
HMM-165  
HMM-263

HMM-361  
H&MS-12\*  
H&MS-13\*  
H&MS-15\*  
H&MS-16\*

H&MS-30  
H&MS-33\*  
MAMS-17\*  
MAMS-37\*

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## CG MARTC

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VMF-351  
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VMR-216\*  
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# BLOWOUT!

As an RA-3B with a crew of four was climbing through 29,500 ft the plexiglass canopy section over the left-hand seats blew out. When the dust cleared, the crew saw that the photo-technician (PT), who had his rocket jet fittings unsnapped for crew duties, had been pulled out of the cockpit to his waist. He was being held in the cockpit by his legs which were wedged between the seat and the aft panel and by his oxygen hose, attached to his torso harness and the aircraft.

The pilot's first reaction to the decompression forces had been to check the cabin altimeter which was indicating about 19,000 ft. He then had extended speed brakes, ordered crewmembers to check their oxygen systems and commenced a descent. Informed by the photo navigator that the PT was hanging out of the blown canopy section, he leveled out until the airspeed dropped to 230 kts and extended full flaps.

When the aircraft slowed to 160 kts, the photo navigator unstrapped and grabbed the PT. The crewman in the fourth seat unstrapped and went to his assistance. Together they pulled the PT back into the cockpit and administered oxygen. His hard hat and his mask which had torn loose from the mini-regulator had been lost in the slipstream. (He had not been wearing his oxygen mask but had had it hooked up and ready for instant use.) He had been hanging out of the cabin approximately 90 seconds. He was unconscious, rousing twice to incoherently fight the oxygen mask.

At 7000 ft, speed was increased

to 320 kts, wing fuel was dumped and an ambulance was requested at destination. On landing, the aircraft was met by an ambulance and flight surgeon and the victim was rushed to the hospital.

Use of oxygen masks was in accordance with NATOPS at the time of the incident. Masks were not removed until passing 15,000 ft and checking cockpit pressurization to be steady at 8000 ft or less. (NATOPS procedures have since been amended for the crew to remain strapped in and on oxygen after leveling off at cruising altitude until sufficient time has elapsed to ensure maintenance of a cabin altitude less than 10,000 ft and windshield panel integrity. Oxygen masks may be removed for short periods for crew comfort but must be connected and immediately available.)

"The coolness and professionalism demonstrated by the flight crew in reacting to the emergency is of the highest standards," the investigating flight surgeon wrote in his report. "The pilot's reaction to slow the aircraft and lose altitude combined with the quick action of the navigator and passenger to rescue the third crewman demonstrate excellent presence of mind. The first aid in the

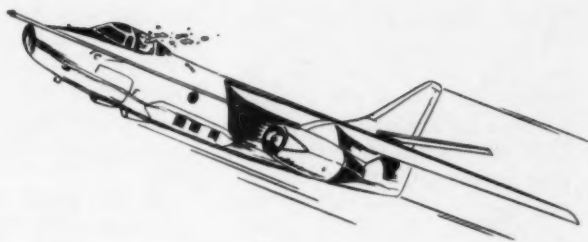
form of resuscitation administered to the PT in respiratory distress was probably life saving."

The PT suffered hemorrhage of the ears, a cerebral concussion and cuts and bruises from the waist up due to windblast and buffeting against the aircraft.

Physical fitness played a part in the outcome of this incident. "The PT is known to be in excellent physical condition," the flight surgeon states, "and particularly for his conscientious following of good health habits and his participation in athletics. His good physical condition, without a doubt, improved his chance for survival of the ordeal."

A similar incident occurred some months later. In this incident all personnel were securely strapped to their seats although following level-off they had removed their oxygen masks.

Approximately five minutes after climb to and level off at 32,000 ft, 250 kts, and 8000 ft indicated cabin altitude, a cockpit enclosure panel failed. Loose particles in the cockpit were immediately sucked out of the aircraft and the navigator's hard hat was pulled from his head and sucked out. No injuries were sustained by these crewmembers.



# For Want of a Nail...

After completing a local flight support mission, the pilot received his steer for homeplate. An enroute idle descent was initiated but upon approaching level off, the RPM was noted at 86 percent. The pilot advanced the throttle but no corresponding engine response was observed. The throttle was retarded and a quick switch to manual fuel control advanced the RPM to 92 percent. Again throttle movement failed to initiate the expected engine response.

The pilot, now in the vicinity of his home field, relayed his difficulties to the tower. After some delay another aircraft, an AF-1E, ren-

dezvoused with the malfunctioning F-1C in an attempt to assist.

Emergency procedures were discussed and a decision was made by the pilot of the F-1C to attempt a recovery into the field arresting gear.

The pilot dirtied up the aircraft and commenced a circling approach to a straight-in landing. At 300 ft and 170 kts approximately one half mile from touchdown, the chase pilot advised the pilot of the F-1C to shut off the engine master switch. This simple procedure was accomplished and the F-1C was flown to touchdown. At this point things turned to the proverbial can of worms.

The aircraft touched down as planned but the hook skipped and failed to engage the arresting gear. To add insult to injury, the engine not only failed to starve after securing the engine master but continued operating at 86 percent RPM. With the runway rapidly disappearing behind him the pilot now rotated to the takeoff altitude and struggled back into the air. As he lifted off the duty the engine master switch was returned to ON. The gear was immediately retracted and a slow rate of climb established. Turning downwind the pilot set up for a second pass with 400 lbs. of fuel remaining.

Pass number two was an exact carbon of number one with one notable added feature . . . not enough fuel for another go around. As the F-1C passed over the fly-in gear the hook skipped and failed



to engage. Maximum braking was commenced and both main mounts blew as the F-1C decelerated through 130 kts. Aerodynamic braking further slowed the aircraft and a successful engagement of the E-27 arresting gear was accomplished. Throughout the entire episode the recalcitrant J-65 had continued to operate at 86 percent RPM.

After the F-1C had fully stopped on the runway, the pilot actuated the emergency canopy release and blew the canopy for a rapid egress. The F-1C suffered slight empenage and canopy damage during emergency canopy actuation.

The pilot, after rather hurriedly taking leave of the aircraft, returned, reentered the cockpit and shut off the manual fuel shutoff switch which promptly (and properly) secured the J-65 by fuel starvation.

It can't happen to me, you might say (to misquote a famous quote by Mr. S. Lewis), but could it? A rather extensive maintenance inspection was performed and the offending component pin-pointed. During the flight a one-time-use steel lock nut (PN AN363-428) had worked loose and separated from the throttle linkage. The end result was painfully obvious—no

cockpit throttle control of the J-65. The how-come-it (self-locking nut) worked loose was no mystery either. It is intended for a one-time-use only and in this incident it had been used repeatedly, with a very costly end result. This particular maintenance bust reminds one of the old saying "for want of a nail the shoe was lost" etc. . . . Maintenance Q.C. in this case cannot be vested with the entire blame. Certainly they ensure that the job is completed correctly, but in many sections in the innards of a bird, it is difficult at best to ascertain from appearances whether you are inspecting a one time usage item—particularly the flashlight/mirror items on a job card.

To prevent this type accident the ASO must continually supervise the maintenance safety education programs in the shops. Only through the use of before-the-fact measures of accident prevention and education can we in the Navy hope to reduce our steadily climb-

ing aircraft accident rate.

Some of you former F-1C (FJ) drivers may have caught the fact that the pilot of the F-1C may have contributed somewhat to his own problems. The NATOPS Checklist is usually intended for use in only one specific model of aircraft. Trying to use an AF-1E Emergency Checklist when coping with a hairy problem in an F-1C is asking for trouble. The pilot of the F-1C found to his chagrin that he was unable to shut his engine down by turning off the engine master switch when using an AF-1E procedure.

The chase pilot, an instructor pilot to boot, erred in that he also read to the distressed pilot procedures from his AF-1E emergency checklist, failing to remember the difference between the two aircraft for securing the engine. It is redundant but germane to remind all pilots to carry and use the NATOPS Pocket Checklist appropriate to the model aircraft being flown. The validity of this statement is quite easily illustrated by the low accident rate in the ferry squadrons.

This incident (near accident) serves well in an educational sense by reminding pilot and ground personnel alike, of the ever present need to be professional. In this incident everyone was lucky, except the man who picks up the tab. He too, enjoyed some degree of good fortune in that he did not have to replace the entire bird.

Think NATOPS, fly NATOPS and above all know your bird cold. Be a pro.



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## Boot Protects

AT the time of ejection from a spinning F-11A, the pilot was using left rudder to max throw. Only his steel-toed boot protected his left foot from severe injury as it struck the aircraft on ejection. The leather covering of the left toe was torn off the steel cap.

The pilot's right leg was flexed with his thigh off the seat. This positioned his spine so that he

received compression fractures of two vertebrae. His spinal injuries were probably worsened by parachute opening shock.

"This pilot performed very well under these circumstances," the investigating flight surgeon reports. "His injuries could have probably been avoided by more careful and self-conscious positioning prior to ejection."

# m your flight surgeon

## SAR Routine

"THE training, discipline and excellent physical condition of Ensign— led to this rather routine SAR mission. Those who realize the time, efforts and dedication required to reach this state of readiness need no further comment on this pilot's actions. In addition, he used excellent and calm headwork in all phases of this situation."

—Flight Surgeon in MOR

## Escape Successfully

ONE of the major reasons everyone escaped from the aircraft was the calm and efficient manner in which the entire crew conducted itself. Every member had his flight suit, hard hat and mae west on and was strapped in for takeoff. This, no doubt, prevented many head injuries and other injuries that might have occurred. The survival training I received was of great value, especially the Dilbert Dunker.

—HU-16C pilot in AAR

## Low Level Strike

AN F-8E was pulling out of a non-firing strafing run at about 300 ft and 475 kts when there was a loud explosion in the cockpit and the pilot felt windblast. Temporarily he was blinded in the left eye, and vision in his right eye blurred. His immediate reaction was to pull up to get altitude for a possible ejection. He had already transmitted several Mayday calls when something flapping on the left of the console caught his

attention. He then saw the broken wind screen and the remains of a bird.

Since the aircraft was flying normally, he climbed to 5000 ft and slowed to 220 kts. Joining up, the flight leader advised him that damage was minor and escorted him in for an uneventful landing.

The pilot's visor was down during the incident. Debris on the visor and a "bit of bird" over his left eye had caused his difficulties.

The emphasis placed on wearing the visor down was reaffirmed with evidence of only a small hole in the visor, which the flight surgeon said obviously protected most of the pilot's face.

"This is yet another positive example underlining the need for using the visor in low-level operations," the squadron commanding officer stated.

## Hold Taut

A BOMBARDIER/navigator who ejected overwater became entangled in his parachute shroud lines. He reported that the MC-1 shroudcutter worked poorly in cutting the slack shroudlines and that he had to use his survival knife.

*Shroudlines should be held taut when you are using the MC-1 shroudcutter.*

## Unsuited

AT the time of the A-6A flight the combined water-air temperature was 117° which necessitates

use of an anti-exposure suit, according to NATOPS. (*The pilot had waffleweave underwear under a summer flight suit and the copilot, regular underwear and a summer flight suit.—Ed.*)

In this case only mild exposure was experienced. . . . However, both crewmen stated that a more prolonged stay in the rafts would have resulted in uncomfortable chilling. In fact, exposure to the elements in this area for a longer period of time with no anti-exposure suits might well have been a factor in their survival.

**Recommendation:** Compliance with NATOPS on the use of anti-exposure suits regardless of projected course and temperature.

—Flight surgeon in MOR

## Word of Caution

PILOTS reportedly have been using unauthorized hardware to jam open the shoulder harness operating handle of the Martin-Baker Mk-5 ejection seat, apparently to prevent the G snubber from trapping the go-forward strap when making maneuvers in excess of 3½ G. This unauthorized practice is dangerous in the event of ejection or carrier landing.

- In an ejection in which the alternate handle is used, serious or fatal injury would almost certainly result due to jackknifing.

- In an ejection in which the face curtain is used, some restraint may be provided but the risk of spinal injury is high.

- On carrier arrestment, it is likely that the pilot's head would strike the instrument panel.



# SECOND CHANCE

By TSgt Thomas J. Garrett, 603 Mil Alft  
Spt Sq. Kadena AB., Okinawa

*Courtesy MAC "Flyer"*

**I**t was a beautiful day for the drive, but my heart wasn't in it. Faye and the kids were sure enjoying it, though. It was the first genuinely sunny day that Faye had seen since she arrived on the island three months before at the beginning of the rainy season. And as for Sammy and Kim, they both oh-ed and ah-ed as we drove along the Pacific side of the island. The strong swell stirred up by last night's storm was sending tall white breakers crashing over the reef

just a few hundred yards off shore.

My mind was so preoccupied that I drove right past the gravel road that we had been watching for. Luckily, Faye noticed it and stopped me. "My gosh, Tom," she said as I turned around, "if I hadn't stopped you, we'd have gone all the way to the other end of the island. What's bothering you anyway? You've had your head in the clouds ever since we left the house."

I swung the car around, drove back to the gravel road, and turned off to the right, deliberately ignoring her question. In a minute she had apparently forgotten it as we drove up the narrow, winding road into the steeply rolling hills that made up the backbone of the long island. The "gravel" of the road was crushed coral which had weathered to the color of an old meerschaum pipe. It wound crookedly past recently planted rice shoots, between tall stands of tasselled sugar cane, and finally—as we neared the steeper slopes—past fields of sharp-spined pineapples. As we reached the top we had a clear view of the China Sea stretched below us, with the clear blue water of the lagoon broken only by small waves that looked like ripples from the top of the ridge. Faye poked my arm and said something about the water.

"Yeah," I mumbled back abstractly. I was more interested in the car radio. The news would be on in a minute. I had been waiting for it for almost an hour; waiting to hear the details of what had been only a short phrase in the news wrap-up as we started out in the car. "There is no further word concerning the cargo aircraft reported missing somewhere between here and the Philippine Islands," the announcer had said. Not much. Not a word about what kind of aircraft it was, what time it had departed or even if it was an Air Force bird. But enough to make me squirm in the driver's seat—and sweat a little—waiting for the news to come on again. I had a right to sweat. After all, I had earned it, hadn't I? Sure, it had been cold and wet that morning, but was that any excuse for what I had done?

It had all started with the blasted maintenance crew truck late again for the third miserable morning that week. There I was, sitting hunched down on my tool box under the wing of a C-124 with the cold wind on my back. I remember pulling the collar of my field jacket up around the back of my neck. It felt soggy, but at least it broke the wind. For maybe the fiftieth time, I searched the line with bleary eyes, hoping to spot the headlights on the truck. It was still nowhere in sight and my head felt like a dead weight after the long, dreary night shift I had just finished.

Not that it had been a particularly bad shift, except for the rain. They were pretty much all alike lately, anyway; twelve hours spent pushing a maintenance crew to do a little more than they thought they should—or could—and a little less than the Maintenance Officer was ever satisfied with. The rain had stopped and the wind smelled of Pacific coral and wet salt water. Except for the monotonous drone of a putt-putt power generator in the vicinity of another C-124 a few hundred yards away, the ramp was silent and deserted. Six months ago I might have enjoyed the solitude and the smell of the sea breeze; now all I knew was that I was tired, hungry, cold, half-soaked, and waiting for a crew truck that should have been there an hour ago.

I took another look around for the truck. Still nothing. I grumbled an unpleasant name for all crew truck drivers and felt a little better for it. That's the way, Tom Jennings, I thought. Blame somebody else for it, don't admit to yourself that it's your own fault that you're out here. If you weren't such a sap, you'd have left one of the troops out here to finish up the carburetor job on this *Shakey* and gone in with the first truck. You can bet your bottom dollar that the rest of the crew chiefs are back in the hangar right now drinking hot coffee. Probably having a good laugh at you, too. None of *them* would stay to wind up a job themselves.

I leaned back against the tire of the C-124 and frowned at the long line of massive transports barely visible through the rain against the leadgray sky of the dawn. Lately, I had come to regard them not as aircraft at all, but as individual aches in a painful maintenance workload. That one was an engine change, I knew; the one next to it had a sick radar; the one past that had been NORS for three days and rumor had it that higher headquarters was breathing down the Commander's neck about it.

And it was grim maintenance, tough maintenance, even weird maintenance sometimes. I remembered the time a flight engineer had pointed out a patch in a cargo door and shown me the little arrow that had been stuck through the metal. "Crossbow bolt," he had said. "Pulled it out myself after we landed at Da Nang." What a hell of a way to run a war!

By the time I recognized the sound of the truck engine and popped open my eyes, it was almost too late. Worse yet, I could see by the direction they were traveling that they hadn't seen me and they didn't know where I was. The truck was a hundred yards across the ramp and almost abreast of me before I grabbed up the toolbox and ran out into the driving

rain. My toolbox banged against my leg as I ran, yelling and waving my free arm.

It was hopeless; the truck continued its steady pace down the ramp, slowly lengthening the distance between us. I stopped running and just stood there in the pounding rain watching the tailgate of the truck getting smaller. Then I turned toward the hangar. It was about a mile or so down the ramp. I stuck my free hand in my jacket pocket and started slogging through the rain. As I walked I felt something hard in my pocket. I pulled it out and looked at it. A cotter pin! Now what the heck is that doing in there. I stopped walking and stared at it. I couldn't have forgotten to put one back could I? Nah, not a chance! Still . . .

A horn beeped and I turned around. The truck was making a wide swing and coming back for me. Somebody in back must have spotted me and banged on the cab. In a minute the truck pulled up next to me and a hand reached over the tailgate. "Hand up your box, Sarge." I lifted the box up to the hand and it scraped over the tailgate and bumped on the bed of the truck. The hand reached out again. "Let's go! I'm drowning!"

As I squeezed down between the two others and the truck started off, I suddenly remembered the cotter pin in my hand. I could see the *Globemaster* getting rapidly smaller through the heavy rain. Seven cotter pins. I thought. And seven I put back. I know I did. Not a chance that I could have left one off. Nah, not a chance! Still I kept the cotter pin in my hand all the way back to the hangar.

Now, as I drove along, that little pin was still burning a hole in my pants pocket. I hadn't really expected the weather to clear off for the drive we had hoped to take on one of the days of my two day break, but Faye had gotten me up as soon as she decently could when she saw the sun come out after all these weeks. And actually, I had been glad to lose a little sleep that I could easily make up so that she and the kids could have a little outing—until I heard the tail end of the news on the car radio.

As we started up the other side of the high ridge, the radio faded a little. I turned it up and waited for the news. The announcer came on and plowed his way through the news in Vietnam, some political shuffling back in the States, and an armed robbery in Boston. Then he came to the part I had been waiting for. "*The Air Force has made no further announcement concerning the C-124 aircraft reported missing between here and the Philippine Islands earlier this afternoon. Although it has not yet been established that the aircraft has actually crashed,*

radio contact was lost with the large Military Airlift Command transport at approximately 2 P.M. local time. At last contact, the pilot radioed difficulty with a runaway engine. A massive search is being mounted and all aircraft and vessels in the immediate area in which the aircraft was last reported have been alerted to join in the search. And now for the sports . . ."

The palms of my hands felt wet and slippery against the steering wheel. A C-124, I thought. A C-124 with a runaway engine. A cotter pin left off a nut on the throttle control valve, a couple of hours with *Big Shakey* in the air, a nut vibrated loose and dropped off. It all fits. It fits too blasted well! Of course, QC should have caught it, but the guys in QC are human, too.

The coral road ended in a stop sign. I stopped and wheeled the car toward the left, heading back toward the house on the main road. Telephone poles began skimming by the car. "Tom!" Faye called out to me after a few seconds. "You're speeding!"



"I'm sorry, Honey," I said, slowing down. "I hadn't realized it."

"You've been preoccupied ever since we left the house," she said. "Are you sure there isn't something bothering you?"

"No, Honey," I lied. "I guess I'm still a little sleepy."

She slid over closer to me and linked her arm in mine. "You know you can tell me about anything that's bothering you, don't you?"

I managed a smile. "Yes, Honey. I know, but there's nothing to tell." How do you tell your wife that you think you may have murdered a crew with your own two hands and that you still have the murder weapon in your pocket?

I kept the nose of the car pointed back toward the house, mechanically operating the controls. The miles and minutes slid behind us silently except for the happy chatter of the kids in the back seat. As we pulled into a small village, Faye poked my arm and pointed at a stand selling coral knick-knacks. I

pulled over and stayed in the car while she and the kids got out and went over to the stand.

The news came on again. I listened impatiently until the announcer came to the news of the aircraft. "Unofficial sources have stated that it is almost a certainty that the C-124 which was reported missing between here and the Philippine Islands earlier this afternoon crashed somewhere in the Pacific Ocean north of Luzon Island. Before radio contact was lost, the pilot reported a runaway number three engine. The aircraft should have landed at Clark AB at 4 P.M. local time and is now one hour overdue. A massive air and sea search has been mounted in the area where the aircraft may have gone down, but aircraft and vessels in the vicinity have reported that heavy seas and low ceilings make search operations extremely difficult and would make a successful ditching highly unlikely. Nevertheless, official Air Force sources, expressing confidence in the ability of the pilot and crew, still hold out hope that the aircraft . . ."

I switched off the radio and sat there feeling sick to my stomach. If there had been any doubt in my mind before, it was gone now. The estimated departure time on the aircraft I had worked on last night had been just about right to put it in Clark at about 1600. They had even said that it was number three engine. As far as I was concerned, that clinched it.

Faye finally finished her business at the coral stand and started back toward the car. I watched her through the windshield as she triumphantly bore back a large piece of brightly colored coral. The kids buzzed around her like a pair of happy gnats. Should I tell her now? What should I say? How do you put it in so many words? I had half made up my mind to it as she climbed into the front seat with her prize.

"Isn't it beautiful?" She asked happily. I mumbled something in agreement. "I know just where I'm going to put it," she went on. "And wait 'till Ellen sees it. She'll be busting to come out here herself."

She went on talking as I eased the car out onto the road and accelerated up to the speed limit. "Not now," I thought. "I still don't know for sure and any way she'll find out soon enough. A runaway number three engine and I did a carburetor change just before takeoff out of here. It won't take them long to put two and two together on that one! Yeah, she'll know soon enough."

"Tom! Tom!!" Faye was poking me in the ribs.

"Huh? What, Honey?"

"I said, 'Maybe we can take Ellen and Ralph out here tomorrow so that Ellen can see the coral.' I'd like to browse around some more myself. My goodness, you sure do have your head in the clouds today! Do you think we can go tomorrow?"

"I guess so, Hon." Tomorrow! Who the heck has a tomorrow! I had one this morning, but threw it away when I climbed into that truck.

A half hour later we were back at the house. I went into the bedroom and started climbing into a pair of fatigues. Faye stopped at the bedroom door and asked me what I was doing.

"I want to take a run down to the line," I said. "I'll be back in a few minutes."

"For crying out loud, Tom! Don't you spend enough time on that flightline? Do you have to go out there on your day off? What are you going to do anyway?"

"I'll only be a few minutes," I said.

"Well, all right. But come right back, will you? I want to get supper over with so I can get the kids in bed. Ellen and Ralph are coming over to play cards, remember?"

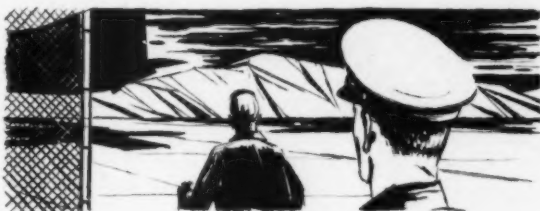
"Yeah, okay," I said, happy that she hadn't pursued the question of why I was going.

As I slid under the wheel of the car, I asked myself the same question. Where to now, Jennings? My hands were shaky and there was a thin veneer of sweat on my face. I wiped it away with the back of my hand and turned the car toward the base. A stupid question! You know where you're going. What's the use of waiting for them to find out? Might as well go in now and admit it. Gotta tell somebody about it anyway. Can't keep it inside any longer or I'll bust!

I wonder what they'll do to me—what they'll say? Major Crouch will be there, pacing up and down in front of me in his office. I never would have expected it of you, he would say. Yes, he would say that. Colonel Henry would be there, too. He would yell. I wouldn't blame him. He was a pilot. He would be thinking how his wife and kids would feel if it was him out there in the water. I had seen that look in a pilot's eyes before. Perhaps it was that kind of special knowledge that bound flying officers so close together. I know what they'll all think of me.

I passed through the gate and traveled around the perimeter road, close to the far end of the flightline. The long line of transports slid by one at a time. Right over there was where the *Globemaster* had been sitting this morning. Another one had already taken its place. I looked at it longingly as I drove past. If only I could turn back the clock a few hours!

Suddenly, in the indistinct twilight, I felt a cold chill in my stomach. I pulled the car over to the side of the road and squinted at the tail number of the C-124 across the way. I couldn't quite read it in the failing light. It could be though. It just had to be! I pulled the car further off the road, got out, and half-walked, half-ran to the small gate in the fence.



The guard gave my car a hard look as he checked my line badge, but he let me go through.

In a minute I was at the aircraft. Even before I got there I could read that beautiful tail number. It was my aircraft. Still there. Why, I didn't know. It may have been crew rest or more maintenance that had held it on the ground. I didn't know—and I didn't care. All that mattered was that it was still there! I went through the hatch and slid out to the engine on the walkway. There they were. Seven cotter pins. Seven in place. The one in my pocket was only a stray. It had all been for nothing. For nothing! I backed out of the wing and slid out the hatch. As I hit the ground, an ACP crew truck pulled up and crew members began climbing out.

A young captain came swinging over to the aircraft, lugging a heavy B-4 bag in one hand, a brief case in the other. He smiled. "All ready to go, Sarge?"

"Yes, sir," I said. "Yes, sir; she sure is—now!"

As I strode across the ramp toward the gate, I let it all sink in. I had been lucky. Lucky beyond anything that I had any reason to expect. I had been granted the greatest of all gifts—a second chance. Somewhere out over the Pacific, aircraft were searching for a MAC aircraft and a MAC crew. Was there someone else walking around now—as I had been today—with a small, sharp piece of guilt burning a hole in his pocket? I prayed there wasn't, for his sake and for the sake of the crew that had staked their lives on him.

Yes. I had been granted a second chance. I knew what to do with it. Every time I saw a man in a flying suit I would pass it on to him. I didn't need it any more. One was enough for me.

SAFETY



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# and the SUPERVISOR

Setting standards by example is a responsibility we sometimes overlook. Actually it is one of the most important and far reaching things we do. It has a direct bearing on the quality of the maintenance performed by all the men whose attitudes we help to shape and whose character we help to mold.

Supervision and safety go hand in hand. A supervisor should initiate safety programs and ensure that everyone who works near his equipment exercises extreme care and is familiar with the hazards involved. One large industrial corporation evaluates their programs by what they save. They estimate that in a three-year period they were able to save 119 eyes. They claim they were able to do this by educating all their employees on the hazards of all jobs.

It has been said in the past that experience is the best teacher. This may be true, however, the U. S. Navy may have lost lives and equipment during the learning process. The necessity for maintenance safety programs is evident, because modern aircraft systems have become more complex in design and in some cases have placed a burden on maintenance crews and flight crews. The U. S. Navy has experienced an increase in aircraft accidents and incidents due to this complexity in design. Electrical and instrument malfunctions as causal factors have increased. Maintenance errors have also increased because of complex design.

The following incidents took place in flight after maintenance operations and have been attributed to maintenance error. In one case, aircraft armament wiring became shorted to a continuous source of current and immediately fired a bomb ejector. In another case, control wiring for a fuel shut-off valve shorted and the valve stalled in the closed position. During a landing, a warning circuit shorted and gave a false gear safe indication; the gear collapsed upon landing. It is evident that supervisors must continually emphasize to the people actually doing the work that by-passing safety features could very well be their last mistake. They must ensure that men guard against conditions that are dangerous on work for which they are responsible and if they do not have primary responsibility, they should at least have the basic knowledge to call dangerous conditions to the attention of those who are responsible.

It is a fact that the failure to deenergize electrical

circuits prior to maintenance functions is one of the most common causes of shock and fire and it almost always leads to damage to expensive equipment. Electric shock may cause instant death, unconsciousness, cessation of breathing and severe burns. The aircraft electrical system is a unique system because it is interconnected to all other systems and reaches into other systems like an octopus. Besides supplying what may be called usual electrical and electronic services, it is also the prime power source for other systems. It would behoove supervisors to ensure that all personnel are aware of the hazards involved.

Each individual in the U. S. Navy should strictly observe all safety precautions applicable to his work or duty. The following general safety rules apply to personnel in all types of activities.

*Reporting Unsafe Conditions.* Each individual concerned shall report any unsafe condition on any equipment or material which he considers unsafe.

*Warning Others.* Each individual concerned shall warn others whom he believes to be endangered by known hazards or by failure to observe safety precautions.

*Personnel Protective Equipment.* Each individual concerned shall wear or use protective clothing or equipment of the type approved for the safe performance of his work or duty.

*Emergency Conditions.* In the event of an unforeseen or hazardous occurrence, each individual concerned is expected to exercise such reasonable precaution that is appropriate to the occasion.

A supervisor belongs to a select group that is marked by its experience, ingenuity, talent and integrity. He has the sympathies and understanding and the temper of mind that set him apart. By being a supervisor he sets the standards of quality in conduct and workmanship. He can take credit for all the love of excellence, all the pride in fine workmanship he inspires. He can find satisfaction in each evidence of integrity patterned after his own conduct. But he must shoulder the onus of every pencil check, every short cut of procedures, and every evasion of regulations permitted by his example. It is good to be respected and emulated but it does have its responsibilities. Safety is one of them and can not be delegated.

# NOTES

and comments on maintenance



Hydraulic component repair, disconnect or change requires functional . . .

## Hydraulic System Tests

**T**he number of malfunctioning landing gear mishaps following aircraft maintenance indicates a need to review existing instructions.

The direct cause of these accidents are attributed to:

- Hydraulic components were improperly replaced
- Disconnections made for inspection and not re-connected properly
- Installed improperly assembled.

To insure safety of personnel and aircraft, BuWeps

(NavAirSysCom) Instruction 13440.1 directs that when any hydraulic component has been installed, replaced, disconnected or partially disassembled on any aircraft, the specific hydraulic system which was affected shall be pressurized and the reinstalled or repaired component shall be given a complete and thorough functional test.

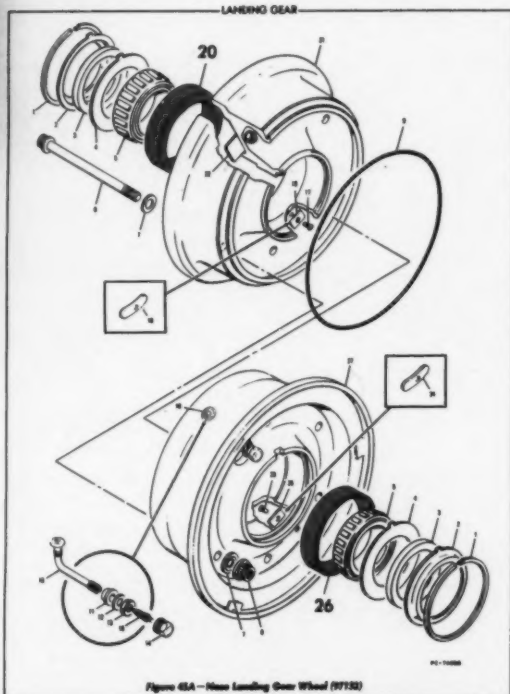
When the affected component is an actuator or sequencing valve, or is a part or assembly of any hydraulically operated subsystem, the test shall in-

clude a complete cycling of the subsystem concerned; i.e. landing gear, landing flaps, dive brakes, power control systems, . . . , at least five times or until a thorough check has been made to determine that its operation and adjustment are satisfactory.

Where the operational test requires the hoisting or jacking of an aircraft to cycle the landing gear, care should be exercised to ensure that jacks or hoisting slings are properly positioned and adequately secured since the shock caused by extension and retraction of the landing gear may cause a change in attitude or dislodge the aircraft.

Under certain conditions, such as hazardous weather, underway operations, or lack of proper testing equipment, it may be impracticable to jack up the aircraft to perform a functional test. In such a case, a thorough visual inspection shall be made by the airframes officer and a suitable entry made in the aircraft log book regarding the type of test conducted.

## They said it couldn't be done.



**They Said It Couldn't Be Done**—Reader AMH-2 Krueger takes issue with an A-4 nosewheel bearing misinstallation—see Letters, page 47. Items 20 and 26, PN 23536, cup bearings of the A-4E can be misinstalled. A-4E maintainers, take heed.

## Lost Cause

Colonel R. E. (Bob) Hamilton, former director of the Army's aircraft accident prevention program said recently, somewhat *facetiously*; "If we can't find out the causes of accidents, there's no use having them."

Here's a case in point—an F-8 flamed out shortly after takeoff causing its pilot to eject and crashed into the water about 8 miles offshore. The SAR effort resulted in an HU-16 dropping a smoke flare near the pilot and wreckage area. Rescue of the pilot was accomplished by helo within 30 minutes.

Salvage efforts failed to locate the aircraft so the cause of the flameout is undetermined.

These comments of the squadron C.O. are noteworthy regarding the lost cause:

"Because of approaching darkness, important salvage of the aircraft for investigative purposes was delayed until the following day. Hindsight would indicate the need to have marked the crash site with a permanent marker buoy immediately."



Experienced investigators also recommend fixing the location by the best means available—landmarks, tacan, radar, loran, . . . —buoys have been known to become detached.

## Supersonic Transport
















AT least 3400 hours total flight test time will be needed before certification of SST aircraft.
















This is twice the usual certification time and more operating hours than your automobile may log from showroom to junk heap.
















Expansion due to inflight heating will cause the aircraft to grow one foot in length during each supersonic flight. When the overall airplane increases in length, each piece of it has to grow in coordination with its neighbors. Conversely, cooling will call for shrinkage to original dimensions.

According to FAA, flight testing will begin in late 1972. Now you know why design engineers have that far off look in their eyes.

—United States Aircraft Insurance Group—Airsurance News

	FROM Director	TO Pilot	Day—Holds one hand over with palm forward, motionless high overhead. Night—Holds one hand with wrist motionless high overhead.
	Director	Pilot	Day—Holds extended index finger of right hand against the flat palm of vertical left hand. Night—Same as day except makes plunging action with hands. Remarks—Signal is initiated by pilot, repeated by director, and answered by deck crew.
	Director	Pilot	Day—Fully extended index finger of right hand from palm of left hand. Night—Same as day except makes plunging action with hands. Remarks—Signal is initiated by pilot, repeated by director, and answered by deck crew.
	Director	Pilot	Same as CONNECT/RECONNECT AUXILIARY POWER UNIT.
	Director	Pilot	Day—Gives "Emergency Stop" to ensure that engines are on. Points of engine to be started while retaining other hand in a cradling motion. Night—Same as day except with hands.
	Director	Pilot	Day—Describes a large figure eight with one hand and points to the line area with the other hand. Night—Same as day except with hands. Remarks—Signal is meant for information only. Pilot should be given a cut engine or engine turn-up signal, as appropriate.
	Director	Pilot	Day—makes "Thrust Cutting" action with one hand. For multi-engine aircraft, points to appropriate engine with other hand. Night—Same as day except with hands.
	Director	Pilot	Day—Holds flat at shoulder level with thumb extended up. Given by pilot when he desires to start engine or turn. Night—Holds wrist in "Thumb Up" position. Remarks—"Thumb Up" reply indicates "all clear."
	Director	Pilot	Day—Holds flat at shoulder level with thumb extended down. Night—Holds wrist in "Thumb Down" position. Remarks—Indicates that all is not OK.
	Director	Pilot	Day—Crosses arms over chest outside arms straight out at sides. Night—Same as day except with hands.
	Director	Pilot	Reverses of SPREAD WINGS signal.
	Director	Pilot	Day—Extends right hand vertically from elbow. Touches right elbow with palm of left hand. Night—Same as day except with hands.
	Director	Pilot	Day—Extends arms horizontally in front of body, palms down. Motion arms 45 degrees. Night—Same as day except with hands.
	Director	Pilot	Reverses of WING UP signal.
	Director	Pilot	Day—Positions hands in front of body, with palms together vertically. Open palms from wrist, diverge until hands are in a vertical "V". Night—Same as day except with hands.

	FROM Director	TO Pilot	Reverses of LOWER WING FLAPS signal.
	Director	Pilot	Day—Positions hands in front of body, with palms together, vertically. Open palms from wrist, diverge until hands are in a vertical "V". Night—Same as day except with hands.
	Director	Pilot	Reverses of OPEN SPEED BRAKES signal.
	Director	Pilot	Day—Holds hands against side of head. Open hands by moving thumbs forward and outward. Night—Same as day except with hands.
	Director	Pilot	Day—Lowers right flat suddenly, thumb extended downward, to meet horizontal palm of left hand held in front of body. Night—Same as day except with hands.
	Director	Pilot	Day—Raises right flat suddenly, thumb extended upward, to meet horizontal palm of left hand held in front of body. Night—Same as day except with hands.
	Director	Pilot	Day—Lapses over with arms hanging as if around a barrel, then opens arms. Night—Same as day except with hands.
	Director	Pilot	Same as OPEN BOMB BAY signal except closes arms.
	Director	Up-down over	Day—Rotates hands in a circle perpendicular to and in front of his body. Night—Same as day except with hands.
	Pilot	Director	Day—Sweeps arms apart, outside thumbs outward. Night—Using hand held light or flashlight, gives on/off signals at one second intervals.
	Director	Deck crew	Day—Gives "Emergency Stop" signal to ensure that brakes are ON. Sweeps flat apart of hip level with thumbs extended and pointing outward. Night—Same as day except with hands.
	Director	Deck crew	Day—Sweeps both together at hip level with thumbs extended and pointing inward. Night—Same as day except with hands.
	Director	Deck crew	Day—Holds arms overhead with right hand clamping left forearm. Undrags right hand from forearm and straightens right arm from elbow. Night—Same as day except with hands.
	Director	Deck crew	Day—Holds arms overhead with right hand clamping left forearm. Night—Same as day except with hands.
	Director	Pilot	Day—Positions hands overhead with palms together. Open palms from wrist to form a vertical "V". Night—Same as day except with hands.

	Director	Pilot	Day — Position hands overhead with palms facing a vertical "V." Clasp palms and slowly. Night — Same as day except with wands.
LOCK WHEEL			
	Director	Pilot	Day — With hands at head level and palms toward face, makes closing motion toward head. Night — Same as day except with wands.
MOVE FORWARD			
	Director	Pilot	Day — Makes backstepping motion with left hand, while pointing at left breast with right hand, index finger extended. Night — Same as day except with wands. Remarks — For HARD TURN, clasp the pointing to breast. For EASY TURN, open hand pointing to breast. At night, vary the rate of backstepping motion to indicate desired rate of turn.
LEFT TURN			
	Director	Pilot	Reverse of LEFT TURN signal.
RIGHT TURN			
	Director	Pilot	Day — Interacts both hands at shoulder height, with arms extended, both pointing to the next director. Night — Same as day except with wands.
PROCEED UNDER GUIDANCE OF NEXT DIRECTOR			
	Director	Pilot	Day — Raises arms to waist level, palms down, makes a downward pointing motion. Night — Same except with wands, held horizontally.
SLOW DOWN			
	Director	Pilot	Day — Raises both hands to eye level, palms to pilot, in palmman's "stop." Night — Same except with wands, held vertically.
STOP			
	Director	Pilot	Day — Crosses forearms overhead with fists clenched. Night — Crosses wands overhead.
EMERGENCY STOP			
	Director	Pilot	Day — Points to nose with index finger. Points to desired direction of turn with other hand, index finger extended. Night — Same as day except with wands.
INCREASE NOSE-SEAS STEERING			
	Director	Pilot	Day — Makes closing motion toward side of head with left hand. Points to pilot's left with right hand, index and middle fingers extended. Night — Same as day except with wands.
NOSE WHEEL STEERING, LEFT TURN			
	Director	Pilot	Reverse of NOSE WHEEL STEERING, LEFT TURN signal.
NOSE WHEEL STEERING, RIGHT TURN			
	Director	Pilot	Day — Makes rapid fanning motion with one hand in front of face. Points to the wheel with the other hand. Night — Same as day except with wands.
HOT BRAKES			
	Pilot	Director	Day — Interacts forefinger in a circular motion, in view of director, indicating that he is ready to run up engine. Night — Makes circular motion with hand held light. Remarks — Director responds with same signal (upward or right) to indicate "Clear to run up."
ENGINE RUN-UP			
	Ground crewman	Pilot	Day — Extends arm to front of body and makes a wide circular wiping motion. Then, brings thumb to mouth as if drinking from a glass. Night — Same except with wand held vertically. Remarks — Pilot extends air refueling probe and sets position for fueling internal tanks only.
SECURE ENGINE, ALL TANKS, NO EXTERNAL POWER			
	Ground crewman	Pilot	Day — Makes a circular motion as if rubbing stomach with palm of hand. Then, brings thumb to mouth as if drinking from a glass. Night — Same except with wand held vertically. Remarks — Pilot extends air refueling probe and sets position for fueling internal tanks only.
SECURE WHEEL, ALL TANKS, NO EXTERNAL POWER			

# AIRCRAFT HANDLING SIGNALS

Aircraft handling signals have been up-dated with the issuance of NWP 41B, dated June 1966. The signals depicted here have been reproduced in poster form and are available from Commander, U. S. Naval Aviation Safety Center, NAS, Norfolk, Va. 23511.

The new poster, B99-PI-365B, Rev. Sept. 1966 supersedes B99-PI-365A, based on NWP 41A. Please destroy all of the older posters upon receipt of the new.

Initial distribution (2 posters per addressee) was made with October "Cross-feed."

For additional signals concerning catapult, carrier landing, and flight deck handling, refer to Appendix A of the CVA CVS NATOPS Manual.



# LETTERS

## Seek Kit

*MCAF, New River*—Here's a report of a problem concerning a SEEK 1 kit. Three of the six matches ignited causing minor charring of some of the kit's contents. The fire was brief due to the lack of oxygen but extensive enough to damage the plastic bottle containing salt tablets. The cause is believed to have been friction and excessive heat due to direct sunlight. Oxidation of some of the medicines could have lowered the flash point enough to allow the matches to ignite. It is suggested that these kits be inspected and the matches be replaced so that they cannot rub against a hard surface or each other.

New subject: It has been noted by our squadron flight surgeon that the salt tablets and the methamphetamine tablets in some of the SEEK 1 containers are both pink and are packaged in similar bottles. In an emergency situation, due to excessive strain and possible shock, the wrong pill could be taken. We are replacing our pink salt tablets with white salt tablets provided by our flight surgeon.

J. E. MURPHY  
2ND LT, USMC  
ASSISTANT ASO  
HMM-262, MAC-26

• Your report on the matches igniting was of great interest to the Naval Aviation Safety Center's survival equipment people. They have forwarded your letter to the Naval Air Engineering Center, Philadelphia, as a matter under its cognizance.

The similarity of color and containers of the salt tablets and methamphetamine tablets in the SEEK 1 kit has been reported to us before. The Safety Center last

year recommended to the U. S. Navy Aviation Supply Office, Philadelphia, that action be taken to change the color and packaging of one of these two drugs to avoid possible confusion in use.

Thank you for writing. Reports such as yours focus attention on problems which might otherwise be missed.

## House Cleaning

*NAS Norfolk*—Here is a local solution to a problem that may be of some use to another squadron. Our readyroom used to look like Fig. 1 while flight crews were being briefed. Since the deck is no place for flight gear, a trip to the dump for scrap lockers and wood, 50¢ worth of paint, and a little effort produced a suitable flight gear stowage rack (Fig 2) which is now in full use.

Our readyroom is now uncluttered but more important, our flight gear receives the care it warrants as in Fig. 3.

R. E. LAVENDER  
ASO, VA-43

• Good Show! All of us should do some house cleaning.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.



Fig. 1



Fig. 2



Fig. 3

## They Said It Couldn't Be Done . . . !



Off-center nosewheel resulting from both cup bearings being on the same side.

FPO San Francisco—"Class Always Tells," July issue reported a maintenance error that was chalked against us AMs. It concerned an A-4E that had all three tires changed. When it landed back home it was found that the wheels were put on wrong. I can't understand how an A-4 nose wheel can be put on that aircraft with both wheel bearings on one side of the wheel assembly.

I've been working on A-4s for some time now and I know that it can't be done.

J. A. KRUEGER, AMH-2  
VA-153

• Here's a direct quote from the the official report: "Nose Gear: Both NLG wheel cup bearings (PN

## Puzzle Answers (from page 9)

G	E	N	E	R	A	T	O	R	M	A	N
Y	A	W	A	C	C	E	S	S	O	R	Y
R	T	T	I	D	R	O	N	E			
O	H	A	N	D		A	S	I	A	N	
M	A	X	R	O	A	D	T	A			
H	E	L	I	P	O	R	T	R	O	O	M
A	L	F	R	O	E	F	O	R	C	E	
N	T	D	I	P	M	A	T	E	S		
G	S	A	M		A	C	O	D	F		
A	A	T	A	J	O	T	R	F	L		
R	A	O	A	R	V	D	S	A	S	E	
N	R	Y	E	A	R		A	U	X		

35326) were installed on the starboard side of the wheel assembly vice either side of assembly (see Fig. 1)." Figure 1 is reproduced herewith and shows an offset nose-wheel resulting from the misinstallation of the bearings. In this instance we were too brief, omitting the word "cup" and the part number identifying which bearing. Seems this PN is only applicable to the A-4E. In any case you are credited with an eagle eye with respect to your intimate knowledge of earlier model A-4s. See diagram on page 43.

## 12 More Needed

Richards AFB—Several very good articles were contained in the August issue of *APPROACH*. As a rescue center, we have 12 detachments under us and would like to pass these articles to them. The articles were "The Youth You Supervise," "Grow Old With Me," and "Rescue Signals Standardized."

Request one of the following actions

be taken so these articles can be issued to our detachments. Either send us 12 more copies of the issue or grant permission to reproduce the articles.

Your assistance will be greatly appreciated.

CHARLES K. SEATON  
CWO W4, USAF  
CHIEF OF ADMIN SERVICES

• 12 copies are on their way to you.

## Unusual Frostbite

MCAS, Cherry Point—An unusual type of frostbite occurred on a cross-country hop which may be of interest to *APPROACH* readers. An F-4 pilot had placed his cigarette lighter in his flight suit pocket, under the anti-G suit. During climb to altitude, the lighter fluid evaporated at an increased rate due to the decreased pressure that was normally present in a pressurized cabin. The cabin altitude in this situation was about 7500 ft, but the rapid evaporation carried away enough body heat to cause a small area of frostbite and local sloughing of a superficial layer of skin.

Volatile liquids evaporate faster in decreased atmospheric pressure. A cigarette lighter in a partial vacuum leaks easily and provides the situation for a nice burn if it comes in contact with the skin.

JOHN T. BONNER  
LT, MC  
FLIGHT SURGEON  
VMFA-531

• Most smokers who are lighter-carriers have experienced that uncomfortable fluid burn, but the threat of frostbite too should be enough to make one cease and desist a bad habit.

## Mk-5-A Knife

AirASRon 32—Thank you for considering my article "Knife on Mk-5-A" worthy of publication in the June issue of *APPROACH*.

I would like to point out that because of the lack of something better, I developed and am using this technique as are my commanding officer, executive officer, and several other officers in VS-32 during the cold weather season.

So far as the possibility of "hang up," in four successive rapid escape attempts through the very small overhead escape hatch in the S-2, I experienced no hang up resulting from my knife.

HENRY W. DIXON, LTJG  
VS TYPE MK-5-A KNIFE MOUSE

• Your idea sounded good to start with. Hope to hear further good results on your method.

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# The Skipper Speaks

On the 17th of May TraRon Four experienced its first aircraft accident in over 3 years and its first fatality in 6 years of operation.

Since the occurrence of this accident I've heard many people say "it was bound to happen" or "you can't go on forever without an accident." My response to this is "hogwash," the fact that the squadron had accumulated some 70,000 accident-free hours did not in any way increase the probability of an accident occurring. Let me illustrate with a simple example.

The probability of throwing a head with a coin is 1:2 regardless of how many previous successive heads have been thrown. This is to say that after a series of tosses of a coin, say all heads for a thousand tosses, the probability of the next toss being a head has not been reduced but remains at the same ratio, namely 1:2.

The coin-flipping experiment is not truly analogous to our situation in that the probability of not having an accident after a large number of accident-free hours does not remain the same, as it does in coin-flipping, but decreases in that the experience level of our personnel has increased.

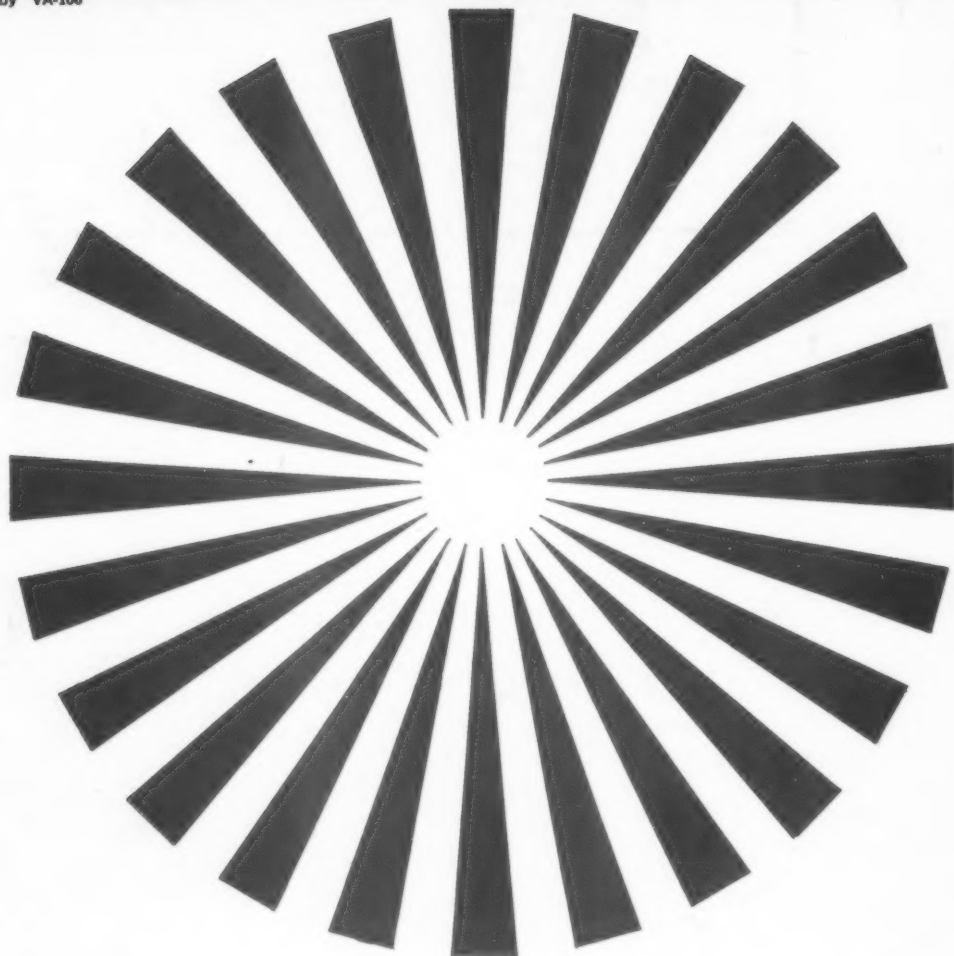
We will attempt to learn everything that we can from this accident so we may further increase our experience level. Already, every officer, student and man in this squadron has taken part in laying the ground work to surpass all previous accomplishments of the finest training squadron anywhere.

By CDR H. Edward Graham, CO, VT-4

## Editor's Note

*TRARON FOUR is vested with the mission of instructing the fledgling naval aviator in basic jet air-to-air gunnery and initial jet carrier qualification in the T-2B "Buckeye" trainer.*





Flight leaders●  
'ramblizational'  
briefs are out,  
STANDARDIZATION  
is a must!☒

